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CONTENTS.

PUBLIC HYGIENE.

Address on Public Health 213

MEDICAL NEWS.

Domestic Intelligence.—Health of Philadelphia 222
New Hampshire Medical Institution, Dartmouth College, Hanover 222
University of Michigan 222
Toland Medical College 222
Philadelphia College of Pharmacy . . 222
Obituary Record 223

Foreign Intelligence.—Influence of Sleep on the Appetite and Reparative Powers . 223
Hygienic Precautions against Cholera . . 224
Curious Physical and Allotropic Properties of Acetate of Soda 224
Presence of Marine Salt in the Maritime Atmosphere 224
Hydatid in the Brain 225
Poisonous Nature of Crude Paraffin Oil . 225
Cholera in London 226
Paris International Medical Congress . . 226
Paris Faculty of Medicine 226
Medical Students in London 227
Mortality Returns in Paris for 1865 . . 227
The Boundou Poison 227
A Novel Infant's Nursery 228
Glorious War 228
Prizes of the Royal College of Surgeons of England 228
Sir Charles Hastings' Fund 229
A Live Gorilla 229
The Head-Quarters of Drunkenness . . 229
M. Jobert de Lamballe 229
Obituary Record 230

JONES ON FUNCTIONAL NERVOUS DISORDERS, 8 PAGES.

PUBLIC HYGIENE.

Address on Public Health, delivered before the National Association for the promotion of Social Science at its Tenth Annual Meeting, held at Manchester in 1866. By W. FARR, M. D., F. R. S.—Public health is the subject of inquiry in your third department. Every life here, the life of every community, is surrounded by dangers, which it is the business of science to study and of art to avert. These dangers are of various kinds, and spring from various sources. Enemies abroad and criminals at home are dangers to which every government is alive. There are other dangers not less formidable. Famine now ravaging India, cholera in Europe, early deaths, sufferings in hospitals, fevers in homes, are instances of a class of dangers that we seek to investigate, avert, and disarm.

Health implies more than existence; it implies energy in strength and in intellect. In Anglo-Saxon one word—*hael*—designated healthy man, hale man, brave man, hero; and *hâelend* was healer, saviour. These simple but noble conceptions it is our business to bear in mind. Development, as well as conservation of life, is the aim of public hygiene—the name by which our science is known in the Continental schools. Private hygiene deals with individuals, public hygiene with communities; but, inasmuch as nations are aggregates of men, it is evident that the division into two parts is only made for the convenience of study and of administration. Some things a man can do himself, others can only be done by town councils and imperial governments. It will be an advantage to confine our discussions to the field of public health.

As political economy rests upon the idea of value, so our science rests upon the idea of health, and it is as important to us to find a measure of health, as it is to the economist to find a measure of value. The

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measure must be simple, and applicable to all countries. Now, the measure that is in universal use is the rate of mortality: a unit of life loses a certain fractional part by death every moment, and the amount of loss in a unit of time expresses the rate of mortality. The unit of time is always a year, and the rate of morality is found by dividing the deaths by the mean numbers living multiplied into the time. The rate varies from ·020 to ·040 in England—that is, in one place the deaths are 20, in another 40 to 1,000 living. Indeed, the range is still greater without a correction to which I will shortly advert.

In the normal community constituted of persons of all ages by an equal number of annual births, there is a fixed mathematical relation between the rate of mortality and the duration of life. Thus, if the average rate of mortality in two cities is 2 per cent., then the mean duration of the lives of the inhabitants is 50 years in the one city and 25 years in the other. Therefore in saying that rate of mortality measures, it is conversely affirmed that length of days measures the health of nations. As the population fluctuates, certain corrections are necessary; the rates of mortality are determined at various ages, and from these the probabilities of living year by year are calculated and set forth in a life table that determines the path every generation passes over from rising to setting.

The mortality is really a life measure, for the people living to a given sum of births increases in exact proportion as the duration of life increases.

If it is only an indirect measure of some of the elements of health, according to our larger definition it expresses in masses the sickness, measures very accurately the influence of a variety of causes on life, and is a safe guide in practice.

Public health now engages the attention of every civilized state; so we can pass in review the principal populations of Europe, and from the researches of their own statists learn by this measure their comparative health.

I take the population in the lowest stage of health first, beginning with Russia. That empire is emerging from barbarism; and its condition enables us to conceive the state of the population of Europe in the dark ages. The people of various races between the Caucasus and the Arctic Ocean, the Oder and the Ural Mountains, die at all ages, from birth up to 140 years it is said, but their mean lifetime is only 25 years.[1] The marriage rate is 10, the birth rate 45, the death rate 36 (per 1,000 is always understood unless another scale is mentioned). Thus birth, marriage, death, succeed each other rapidly among the sixty millions of people diffused over nearly two million square miles of steppes, forests, farms, and river-side pastures. In Archangel, where the greatest extremes of cold are experienced, the mortality is nearly the same as it is in England; in Esthonia and Courland, on the Baltic, the rate is low; so it is in Finland; while about the Caucasus, the Black Sea, and the Caspian, it ranges from 40 to 52.[2] Whenever the mortality is excessively high in any place its causes can now almost always be discovered; they are familiar enough to us in England, but as they take different forms in different countries, and are the subjects of inquiry in Russia itself, it is not my intention to dwell on them. Russia has emancipated her serfs. Russians have taken a conspicuous part in the international statistical congresses; they are frequently inquiring into what is doing in England; and, if I mistake not, English engineers are now engaged in the water supply of one of their capitals.

Italy, extending from the Alps across the middle of the Mediterranean, offers a strong contrast to Russia; it is divided by the Apennines, breathes the air of the sea, is not frozen by hard winters, is the home of the arts, and inherits the renown of the empire of the world. But the Italian people suffer much; few live to their natural term; the death rate is 30.[3] I speak now of the new kingdom of Italy. The death rate in Piedmont and Lombardy, and in the islands of Sicily and Sardinia, is 29; south of the Po, in Parma, 35: Modena, 31; Romagna and the Marches, 31; Tuscany, 33; Naples, 35; Umbria is the healthiest province of Italy, rate 27; and Rome, thanks to her aqueducts, is perhaps the healthiest city in Italy. Venetia, under the Austrians, was in health on a par with Tuscany, 33. It is a peculiarity of Italy that the population of the country is as un-

[1] Reg. Gen. 6th Report, p. 327.
[2] Ibid., p. 330.
[3] Three years, 1862–4. Reg. Gen. 27th Report, p. xxxviii. The mortality of provinces is for the year 1862.

healthy as that of the towns. This low standard of health is the fruit of the former state of things as the new Government has had little time to do more than bring the evils to light, which luxuriated under small paralyzing despotisms. As the science of Italy reveals the evils and their causes, the people will find remedies; and among the first will probably be the restoration of the great drainage works and the magnificent aqueducts of their ancestors. Improved health will increase the military power of Italy.

East of Italy is Greece, which holds only a fraction of the Greeks, about whom little can be said; and Turkey, Syria, Egypt, North Africa. All known about these fine regions of the world is that they are desolated by diseases, are unhealthier than Russia or Italy, and are nurseries of the plague that subjects Europe to the vexatious oppression of quarantine.

Spain, lying west of Italy, between the Mediterranean and the Atlantic, mountainous, and divided by deep-cut rivers, was perhaps, when she colonized South America, the healthiest country of Europe. The death rate of Spain is now 28.[1]

Between Italy and Russia, on the Danube, extending from the Carpathians to the Adriatic, lies the Austrian empire, full of natural resources and pervaded to a considerable extent by the industry and science of Germany; yet the death rate of Austria is high; it is 30.[2] The mortality of Prussia is not quite so high; it is 29; in Bavaria, on the Upper Danube, it is 29; in Saxony, on the Elbe, 29. At such rates 72 millions of Germans and their associated races die. In none of these countries do the people live on an average 30 years.

We now enter a healthier region of Europe, of which England is the centre; where the people live, on an average, 35, 40, or 50 years, and where a fuller life is enjoyed. Take Norway, for example, with its Udal proprietors along fiords and streams; there the mean lifetime of the people is full 50 years. The death rate is 17; the birth rate is 34. They are, as the old sagas teach us, at home on the ocean, and emigrate freely. In Sweden as well as Denmark the mortality rises to 22; and the mean lifetime of the Scandinavians is about 44 years.

[1] Four years, 1861–4.
[2] Eight years, 1857–64.

Sweden I may remark, is famous in our science for furnishing Dr. Price with the data from which the first national life table was constructed. In Hanover the death rate is 23; and in Holland, on its canals and river deltas, where the greatest natural sanitary difficulties are found, the mortality is 26,[1] the mean lifetime is 35. In Belgium other difficulties have sprung up; the population is the densest in Europe, thanks to its industry; but the death rate little exceeds 22. If we ascend the Rhine to Switzerland, we there find several healthier cantons.[2]

In France, that varied and beautiful land lying between England and Italy, Germany and Spain, the death rate was 23; in the last year or two it has fallen to 22, as low as that of England.

No variation in the health of the states of Europe is the result of chance; it is the direct result of the physical and political conditions in which nations live. This is so well understood that the people of every country are associated with you in these inquiries, and are watching the progress of the great question of public health in England. Yet its vital importance is nowhere fully recognized; its influence in the history of mankind is lost sight of in the din of war, and in the terrors of revolution. With what just eloquence have Burke and the historians of all nations denounced the furious executions of Paris. But in Germany, including districts under paternal well intentioned sovereigns, some 300,000 men, women, and children are killed every year by diseases, in excess of the numbers dying of the same diseases in France.[3] Under the indolent princes of Italy, the annual life loss in excess exceeded 150,000 lives annually. Not to save in some circumstances is to destroy. Can we wonder, then, at the feverish uneasiness of those great populations, whose instincts have led them at last to coalesce in powerful states?

I now ask you to consider the sanitary state of the United Kingdom. The rate of mortality is 22. The rate is nearly the same in Scotland, England, and Wales. But how fares it with Ireland? Well, as

[1] Sweden, 1841–55, males, 41.28; females, 45.60. Holland, 1850–9, males, 34.12; females, 36.43. Berg and Baumhang. See paper by Hendrick, F. Stat. Soc., vol. xxvi. p. 423.
[2] 1857–64.
[3] The mortality in France 1853–62 was at the rate of 23.82; Prussia 1851–60, 29.00; Austria 1857–62, 30.38; Italy, 1862, 31.28.

far as official documents go, the death rate of Ireland is 17; and, after every allowance for defects in registration, which has only been recently established, I do not think the death rate of Ireland can be set higher than that of Scotland.

From the English Life table we learn that the mean lifetime of the nation is 41 years (40.85),[1] and this implies a corrected mortality of 24 (exactly of 24.47) annually, whereas by the ordinary method the mortality is 22 (or 22.45). The difference arises from the increase which throws into the population a mass of young persons at ages when the mortality is below the average. The average age of the dying is reduced from the same cause—it is 29 4 years. Similar corrections of the mortality are required, and will ultimately be made, in other countries.

The mean age of the population by the Life Table is 32 years; the mean age of the enumerated population in 1861 was 26½,[2] the difference of 5 5 years arises from the same cause. If a normally constituted population has lived 32 years, it will live 32 years under the same law of mortality;[3] but in England the age of the people is now 26.5 years; and they will live 35 6 years on an average. As they are younger they have an ampler prospect of life before them than a stationary population.

You are aware that more boys are born alive than girls, and the boys dying in greater numbers, this provision of nature brings the sexes nearly to an equality of numbers at the age of marriage. Thus, of 1,000[4] children born in England, 512 are boys, 488 girls; 334 men, 329 women, live to the age of 20. The excess of boys is reduced from 24 to 5; and if there was no emigration and foreign service, the men of the age 20–40 would exceed the women in number. An unchanging 1,000,000 of annual births will produce, according to the law of vitality in England, a population of 41 389,940, consisting of 20,426,138 males, 20,432,802 females, large numbers differing quite inconsiderably.

The births registered in the United Kingdom in 1865, exclusive of the islands in the British seas, amounted to 1,006,223, and this is below the actual number, as all the births are not registered in Ireland or England. The population of the United Kingdom, including the islands, is now estimated at 14,775,810 males, and 15,553,397 females. England differs from the other countries of Europe in this respect;[1] it has 250,356 men in the Army, Navy, and merchant service abroad, on the seas, and in English possessions. This leaves 14,525,454 males at home, against 15,553,397 females. The females exceed the males in the United Kingdom by 1,027,943. After deducting the men abroad having English homes, the number is reduced to 777,587 women. The proportionate number is greatest in Scotland, least in Ireland.

Nevertheless, if our calculation is correct, the men must be somewhere in existence; and, in fact, in America and in Australasia alone at the last census, the males found exceeded the females by nearly a million (972,530). Allowing for the share of other nations in the surplus, there can be no difficulty in identifying the men of which the 777,587 women at home complete the calculated couples. The men are in Newfoundland, New Brunswick, Canada, Australasia, and the United States, whither the women have hitherto hesitated to sail from home across the ocean; but with constant magnetic communication, commercial intercourse, and the intimate union of the people on both sides of the seas, the equilibrium of the sexes cannot fail, in the end, to be re-established.

It is gratifying to find that the health of the English race on the other side of the seas, so far as we can judge from imperfect documents, is not worse than it is in England; and that those rising communities are eager to adopt all the sanitary improvements of Europe. In some respects they have gone ahead of Europe; I may refer to the magnificent aqueduct pouring the fresh streams of a mountain river into New York since the year 1842, when Paris and London were drinking polluted waters from the Seine and the Thames.

A word on the growth of population in England, which is unquestionably one of the weightiest of all our hygienic problems. The population of the United Kingdom was 16,302,410 in 1801; it is now 30,329,207.

[1] "English Life Table," p. 22, based on returns of population, 1841 and 1851; and 6,470,720 deaths in 17 years, 1838–54.

[2] "Report on Census," 1861, p. 110.

[3] See this curious law demonstrated in "English Life Table," Introduction, p. xxxii.

[4] See "Life Table," p. 24.

[1] Census Report, 1861, p. 5.

Population naturally increases in geometrical progression; and in this country the rate of increase was very uniform during the fifteen years of war down to 1815 and the fifteen years following. After the reform of Parliament and Catholic emancipation, so well calculated to content the people, the rate of increase decreased slightly down to 1841; and then rapidly, after the potato blight and the repeal of the corn laws, during the exodus, down to 1851; and since more slowly. The decennial rate of increase was 15 per cent. (1821–31), 11 per cent. (1831–41), and in the last decenniad (1851–61) it was 6 per cent. Thus our population increases at a decreasing rate. In the first thirty years of this century the addition to the population was 8,121,178, in the second thirty years it was 4,935,339. The rate of increase was 50 per cent. in the first and 20 per cent. in the second period.[1] The great perturbation took place in Ireland, where the population rose 2,000,000 in the first, and fell 2,000,000 in the second period. In England the population increased steadily 5,000,000 in the first, 6,000,000 in the second period.[2] The change in the rate of increase is due to no decrease of energy, but to the flood of emigration, for the population, like a mighty river, flows into America and Australasia. The population of the American Colonies, of the United States, of Australasia, and of the United Kingdom was 20,000,000 in 1801, 38,000,000 in 1831, and 65,000,000 in 1861. Here is an increase of 18,000,000 and of 27,000,000, or in the aggregate of 45,000,000 in sixty years; and after deducting sufficient numbers for the increase of alien races, a residue of increase is left equal in its multitude to the present population of France. The English race thus unites Europe with America, and attains, while multiplying freely on both sides of the Atlantic, nearly the same standard of health.

I have, in this rapid survey, necessarily treated the health of nations collectively; but each nation consists of parts differing widely in health. Thus, in Prussia the death rate is 25 in Pomerania, 36 in Posen; 25 in the Rhine provinces, 36 in Prussia proper. France presents similar disparities. And in no countries are the disparities greater than in England. Districts of this kingdom, more populous than Norway, are as healthy as Norway; whilst several of our cities teeming with industry, intelligence, wealth, and population, pay a death-toll as high as Russia. I enter into no details, because this subject has been discussed in the section by gentlemen deeply interested in these districts, who have developed the facts, and have been able, after laying bare the causes, to say that they see the way to effectual remedies; so that in city and village alike the health of the people may increase faster than their numbers.

In the great Arsenal, at Woolwich, the other day, I was much struck by the vastness of the operations: there you see the latest inventions of chemistry and mechanics turned to account; children, stalwart smiths, engineers, and men of science are all engaged in casting bullets, making cartridges, filling costly Armstrong shells, building up ordnance of terrific power to arm iron ships, or inventing new explosives. I confess that the thought that ever bullet was cast with the deliberate intention of killing a man, made an impression on my mind; and this was deepened by the reflection that the Arsenal is necessary, as similar operations are going on all over Europe. Nations are passionate rivals in the art of destroying life in war. Why should they not throw the same ardor into the art of salvation in time of peace?

Life can be saved by studying the causes of its destruction—injuries and diseases. Lightning had no sooner been identified with electricity, than Franklin invented the lightning-conductor. With his knowledge of flame and gases, Davy invented the safety-lamp, to save men from the terrible effects of explosions. The same object is secured now effectually by the improved ventilation of mines. Fire-escapes and fire-guards save hundreds of lives from the flames. Lifeboats rescue mariners from the waves. Chemistry finds antidotes for poisons. Surgery, armed with Harvey's discovery, ties bleeding arteries. From Jenner, Medicine has learnt by vaccination to prevent smallpox. And this brings us to the class of zymotic disease, over which new power has been acquired recently by the discovery in England of the laws of its propagation.

A surgeon dips a lancet into the pustule of a smallpox patient; on its point is a

[1] The first ratio $r = 1.4981$, the square root is 1.2239; which is nearly the second ratio = 1.2021.

[2] 4,933,467 in 1801–31, and 6,124,854 in 1831–61; or 54 per cent. and 44 per cent. on the population.

drop of transparent lymph; and that lymph, mixed in the blood of a child that has not before had the disease, reproduces the lymph in new pustules, which will again propagate the disease among other children. The matter is volatile, and other children brought into the same atmosphere, are said to catch smallpox. If the lymph is derived from a cowpox pustule, it reproduces cowpox. In large lying-in hospitals it has been found by repeated experience that childbed fever, or what I call *metria*, is generated: one woman falls ill, other women take it; every fresh patient that enters dies; and if the hospital nurse attends a lady out of doors, that lady will probably die of childbed fever. Erysipelas, pyæmia, and gangrene are generated when you crowd wounded soldiers in military hospitals; and the specific matter of each of these diseases produces the same specific diseases in other soldiers.

Typhus has been generated in gaols, and has infected the judges in courts as it infects physicians in fever hospitals. Here is a large number of diseases which we know how to produce; and a second group equally numerous we know how to propagate—such as measles, scarlatina, hooping-cough, and smallpox. In the statistical nosology I classed all diseases of this kind together, under the head of zymotic diseases; and in the analysis of morbid phenomena gave names to the different species of matter generated in each malady. Thus, selecting a few, the matter of smallpox (variola) is called *varioline;* of cowpox, *vaccinine;* of erysipelas, *erysipeline;* of scarlatina, *scarlatinine;* of syphilis, *syphiline;* of typhus, *typhine;* of dysentery, *enterine:* of cholera, *cholerine.*[1] These matters introduced into the blood directly by inoculation, or by air, or by water, only induce their transformations in a certain number of the persons exposed to their action. They vary from day to day in strength. Cases of smallpox, for instance, occur every week in London: few children die of smallpox for weeks together; when suddenly the *varioline* becomes active, is multiplied with redoubled velocity, destroys large numbers, and after a time again becomes quiescent. All zymotic diseases follow this law, and are hence called epidemics, endemics, plagues; which, as their cause is not evident, have often been referred to supernatural agency. In their course they are generally influenced by atmospheric vicissitudes: but the zymotic stuff probably acquires its extreme diffusiveness in some wretched families under hygienic conditions that favour its creation. Asiatic cholera thus originated in the delta of the Ganges, in spots where the huts are on mounds, surrounded with pits, which are the receptacles of dejections and of the stagnant water the natives drink. Jameson says, "Bad water no doubt sometimes immediately induces the disorder."[1] In India they had advanced scarcely any further in the etiology. The English reports on the epidemic of 1832 and the elaborate official French report[2] discussed all the conditions except one likely to influence its course, and their results were purely negative. They stated, but did not solve, the problem of the disease. The English system of registration was established in 1837, and in the epidemic of 1848–49 the age, profession, date of death, and the place of death of each person by cholera was published by the Registrar-General in the London weekly tables of mortality. These tables were freely distributed among men of science, who had thus an opportunity of studying the facts. London presents a favourable field for the analysis of epidemics. It has a vast population, spread over a large area at different elevations, arising from ground below the Thames level to Hampstead and Norwood. The population exists in every degree of density, in every degree of poverty and wealth. It was supplied in 1849, by eight companies, with unfiltered water, some of it drawn from springs, the rest from different points of the Thames and its tributary the Lea. At that time the sewers of London poured their contents into the Thames at different parts of its course, so that the waters of the companies differed very much in impurity. At Hungerford Bridge it was charged with soil, and higher up the tidal stream the water was comparatively pure. It was immediately found, on examining the returns, that cholera was much more fatal on the south side of the Thames than on the north; and at the close

[1] Registrar-General's 4th Annual Report, 1842, pp. 186—216.

[1] Cholera Report to Reg.-Gen., p. lxxxvi.

[2] Rapport sur la Marche et les Effets du Cholera Morbus dans Paris, 1834.

of the epidemic, calculation showed that the mortality had been at the rate of 41 on the north, and 120 in 10,000 on the south banks. The two populations differed in many respects, and further analysis was necessary. The population in 38 districts, each[1] a large city in magnitude, was variously grouped according to (1), wealth determined from rated value, (2) density, (3) elevation, and (4) water supply. It was shown that density and wealth in their different degrees had an influence on the mortality of the epidemic; but that the effects of these influences were completely overwhelmed by the influence of water and of the elevation of the soil. Thus, the six districts supplied with the least impure water lost, in every 10 000, 15 by cholera; the fifteen districts getting still more impure water lost 48; those getting the water from the parts of the Thames saturated with sewage lost 123. The air and the water of wells, and the water containing impurities in suspension, running along tubes underground from the river up the sides of heights, contain different amounts of such matter in suspension running along tubes underground from the river on the sides of heights, contain different amounts of such matter in suspension at different elevations; and it was found that the mortality ranged from 174 deaths by cholera in 10,000 people on a level with the Thames, to 99 among those living on ground 10 feet higher, and thus the mortality fell to 53, to 36, to 27, to 22, to 20, to 8; as you ascend, 30, 50, 70, 90, 100, 350 feet above Trinity high-water mark. In the epidemic of 1853–4, and in the epidemic of 1866, the same laws prevailed.

That was all that could be rigorously determined in 1848–9, and the experiment was incomplete, as the drainage of the ground and other conditions in which the people of South London lived differed in many respects from the corresponding conditions on the north side of the Thames. South London is supplied chiefly by two companies. In the interval between 1849 and 1854 one company supplying South London was driven higher up the Thames, and got above Teddington Lock water uncontaminated with London sewage, while the other company still drew its water in 1854 from the impure stream below. Here was an experiment on a grand scale. Asiatic cholera was epidemic once more, and retained its full power of destruction in the districts still supplied with impure water; but it was immediately discovered in the returns of the weekly tables that the mortality in the districts supplied with the better water was diminished. The difference was striking in houses of the same street supplied by the two companies, and it was observed every week in every district. After the epidemic was over the two companies furnished lists of all the houses which they supplied, and when the deaths by cholera in these two classes of houses, both in 1849 and 1854, were taken out at the General Register Office and tabulated, the result satisfied the Committee for scientific inquiries of the Board of Health[1] that the dimipished mortality was due to the change in the quality of the water.

This reasoning involves no theory. The result is arrived at by induction drawn from a vast number of instances all concurring. But I am bound to notice here an important theory which was advanced in 1849 by Dr. Snow, a London Physician, who died young, but whose name will not perish. This, in a few words, is Snow's theory:—The rice-water discharges are to cholera what the lymph (varioline) is to smallpox; the matter is generated in the body, it is multiplied in the intestines, and diffused by direct handling or by water and, I should add, by air in certain states carrying it suspended as dust—cholera-dust.

Dr. Baly, in his admirable but cautious report to the College of Physicians, decided against the theory, and, in fact, the evidence then in its favour was not conclusive. But Dr. Snow persevered; he collected instances of the communication of the disease through pumps, wells, and rivers: and, in 1854, inquired at every house of certain districts where deaths from cholera occurred in Southwark. Thus he collected many new confirmatory facts. Some links had been left incomplete in the verification of the law that cholera matter (cholerine) is diffusible through water; these have been supplied in the present year partly by what I cannot but consider a deplorable accident.

[1] Registration Districts of London, 36; two were subdivided.

[1] The Committee consisted of Arnott, Baly, Farr, Owen, Simon. The subsequent report by Mr. Simon gives the final results of the Committee's investigations.

South London, it will be recollected, was still supplied with impure water in 1854 by one company (the Southwark), and it suffered severely in the epidemic of that year. In the field of the other company (Lambeth), the mortality was much reduced, but was not inconsiderable. In 1866 South London was supplied with water by the two companies from the purer sources; the shallow wells were dried by the metropolitan drainage, and the deaths by cholera in all the districts, holding 873,548 people, were not so numerous as the deaths had been in 1854 in a single district. Thus you have these sequences, in the Lambeth field, impure water, 1849, cholera terribly fatal—pure water, 1854, cholera much less fatal; in the Southwark field, impure water in 1849 and in 1854, cholera terribly fatal in both years; in 1866, both field with pipes interlaced, in South London, supplied with the purer water—mortality from cholera comparatively slight, but sufficient to remind us that the water is not yet perfectly pure.

Cholera had been epidemic in the continental cities since 1865, but London rested secure, expecting to escape with comparative impunity, when lo! in July, the weekly deaths by cholera sprang up from 6 to 14, to 32, to 346, to 904, to 1053, with an unexampled velocity, and threatened to renew all the horrors of the former plagues. The weekly returns showed that multitudes of men, women, and children, spread over an area of about ten square miles, were indiscriminately struck down by diarrhœa or cholera.

In East London 3613 people perished in six weeks. The great destruction of life occurred in every district, nearly every sub-district, supplied from the Old Ford reservoirs of one of the eight London companies, and to the same extent nowhere else. These reservoirs are close to the Lea, which is a tidal river, polluted with the sewage of West Ham and of East London. In Manchester the water is immediately under the control of the Town Council, and you can know all about the supply; but in London that is not the case, as the water is supplied by private companies on strictly commercial principles. The directors are not bound to tell us precisely what their servants do, and they have not done so; but circumstantial evidence irresistibly shows that polluted water was distributed over all the area of extraordinary mortality during a certain number of days, with the same result as in previous epidemic years. The source of mischief was no sooner pointed out than the plague began rapidly to decline; it appeared to be under control, and the mortality by cholera in East London is now as low as it is in the rest of the metropolis.

When zymotic matter or any impurity is thrown daily into the mains, pipes, butts, houses, and, I may say, bodies of a population, it is irregularly distributed, and requires many successive daily changes to eliminate it; thus, when impure water is supplied for three days only, it may take thirty days to eliminate it. This may be demonstrated mathematically, and be illustrated by experiment.

I may add that, although the distress from the loss of thousands of children and parents in an epidemic is never wiped away, yet in East London it has been mitigated; the people behaved with courage and patience; they helped each other in danger, and they were helped by enlightened English charity. The Queen herself came to their relief; Mrs. Gladstone, Miss Marsh, Miss Sellon, and Miss Louisa Twining, treading in the steps of Miss Nightingale, administered relief to the sufferers; the Bishops of London and the Lord Mayor upheld the honour of their high office by indefatigable services. The medical men, and, it is right to add, the clergy, nobly did their duty; the local authorities, to a greater extent than they ever did before, carried out the judicious recommendations of the Privy Council. House-to-house visitation was in many cases in use for a time.

By these means, by the exertions of the engineers of the companies, and by the early discovery of the source of the terrific mortality in East London, the plague has been stayed; we now know how Asiatic cholera can be subdued. In London twenty thousand lives have been saved. This is an achievement of the science of health which reflects some glory on England, and of which all the world will enjoy the advantage. It is due to many years of labour—to the labour of Jameson, Scott, Orton, Balfour, Martin, Parkes, in India; to Sutherland, Smith, Baly, Gull, Simon, and especially to Snow, in England; to the English registration of deaths, which enabled us to demonstrate by several experiments

in the largest city of the world, the fatal effects of water tainted by impurities.

How did it happen that the disastrous effects of the diffusion of this matter through water were not discovered in Paris or elsewhere? For this simple reason, that when the observer has under his eyes a population all supplied with impure water, he cannot logically refer the effect to the specific cause. For this happens in cholera, as in all zymotic diseases, only one individual in a given number is susceptible; for the sake of illustration, say 1 in 4. Only one in the number susceptible (say 1 in 5), by chance comes in contact with the stuff; and only one vessel of water in a given number (say 6) contains a dose strong enough to induce Asiatic cholera, as it is called. Then, by the doctrine of chances, only 1 in 120 (that is, $\frac{1}{4} \times \frac{1}{5} \times \frac{1}{6}$) will be attacked, and about 1 in 240 will die of the disease. Great numbers will be attacked by diarrhœa and milder forms, but 119 will not be attacked by cholera while 1 is attacked. Here are 119 instances in favour of and 1 against the water.

In the worst district of the East London field 193 in 10,000 people died of cholera. Say that 386 were attacked, then 9614 were not attacked, and the health officer might reason thus: 9614 persons in this district exposed to the cause—water—were not attacked, therefore the disease was not caused by the water; and of the 386 attacked some drank no water, the fact being that they were tainted in other ways. This logical difficulty is the origin of the greater part of the disputes on contagion. We overcome it by comparing the mortality of cholera in all the East London districts, the Lambeth districts, the Southwark districts, with the mortality of all the districts—many of them similarly situated as to condition—supplied with water from other sources. As the difference is uniformly enormous in successive trials at distant dates, the conclusion is irresistible.

In Manchester the people have, with great credit to their intelligence, secured a supply of pure water; in fact, the systems of Manchester and of Glasgow are models to other cities. But Manchester retains the excreta of the sick from all zymotic diseases, with other impurities, close to the dwellings and under the faces of the people. By comparing the mortality of the city so organised with that of London when the metropolitan drainage is in full operation, and with that of other cities where such matters are now carried off by water, you will be able to analyze the effect of your system of arteries without veins, and I suspect that it will be decisively condemned by the result. The effect of a multitude of other causes on health, such as overcrowding, uncleanliness, and drunkenness, can be tested by the same methods.

To render our investigation of causes affecting public health complete, there should be a public registration of every form of sickness and infirmity, as well as tests of strength by the quantity of work performed, either mental or muscular. The conscription and recruiting examinations are the only tests now in use.

The sanitary society in Manchester has commenced some work of this kind, and will, I hope, persevere. In the diffusion of sound, practical, sanitary information, the Ladies' Sanitary Association in London has already rendered services which we are bound to recognize. The Universities of England will, I hope, teach, as the Continental Universities do, the doctrines of public health, and by recognizing the doctrines in granting degrees, as suggested by Mr. Rumsey, they will promote the health of their country. Manchester and all our cities will, like Liverpool, Glasgow, and some districts of London, have accomplished officers, educated in the end specially for the purpose, keeping incessant watch over their health, like tutelary geniuses, and doing good not only to the inhabitants, but to mankind.

For what good has been done hitherto by hygiene, however striking in building up healthy generations, is nothing compared with what remains for it to accomplish in times to come.

Let there be a small ratio of improvement among the millions born every year in the successive generations of our own race—in the races of Europe—and under that law of geometrical progression even with which the world has been sometimes terrified unreasonably, mankind will attain a degree of excellence of which we have no conception. Healthier, happier men may become as by miracle only a little lower than the angels in the golden age, the paradise of the future.

How far we are from this consummation we are reminded by the losses of our friends and fellow-labourers. Since we met last

year, Sir Charles Hastings, President at York of the Health Department, is dead. He was a man most friendly in his nature, and devoted himself to the organization of a great Medical Society for the promotion of science. His life was crowned with success; and he had the supreme felicity of seeing his son lay the foundations of this Association, in conjunction with some of the greatest and some of the best men of the age.—*Med. Times and Gaz.*, Oct. 13, 1866.

MEDICAL NEWS.

DOMESTIC INTELLIGENCE.

Health of Philadelphia.—The bill of mortality for the last five weeks, which we give below, shows that cholera and bowel affections have gradually diminished, and that, during the past week, not a single death from the former disease has been reported. The first cases of death from cholera were in the week ending July 14th, when 3 deaths were reported, and it reached its height during the week ending Oct. 13th, when the deaths were 127; thus the disease prevailed during a period of 18 weeks, which is rather longer than the average period of its prevalence in any one locality.

The highest mortality from bowel affections as well as from all diseases, was, during the week ending July 21, when the deaths from bowel complaints numbered 238 and from all diseases was 716; while during the week ending Nov. 24, the deaths from the former had dwindled down to 7 and the general mortality to 255. The health of the city may be now regarded as good. The only disease in which we find a marked increase is scarlet fever, the mortality from which during the week ending Nov. 24th, was 20.

1866.	Mortality in Philadelphia from						
	Cholera Infantum.	Diarrhœa.	Dysentery.	Cholera Morbus.	Cholera.	Total Bowel Affections.	Total Mortality from all diseases.
Week ending Oct. 27,	7	6	3	4	43	63	295
" " Nov. 3,	4	3	9	4	41	61	285
" " " 10,	4	6	1	2	19	32	263
" " " 17,	0	4	1	0	5	10	233
" " " 24,	1	2	0	4	0	7	255

New Hampshire Medical Institution, Dartmouth College, Hanover.—At the annual commencement of this institution held on the 31st of October, the degree of M. D. was conferred on 28 candidates. The increase of fees, it is stated, has not diminished the number of students, the class not having been larger except at one session, for the last twenty years.

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University of Michigan.—Prof. Samuel G. Armor writes to us that "the class in the Medical department of this University the present session numbers over 500. Our students come from a great distance. I believe every State in the Union is represented; besides quite a number from Canada and other foreign countries.

"The steady and rapid growth of the University has been very wonderful, and especially when we reflect that it costs a student at least *twice* as much as any other school west of the mountains, St. Louis alone excepted. The Regents charge $30 for every student *out of the State;* this added to travelling expenses, and the two months' additional time, make the expenses of the student much greater than in any of the Western Schools, with the exception mentioned. Our term is *six months*, no student getting his ticket till the close of the term. We think we have made a move in the right direction by establishing a *six months' term*, and having but four lectures a day."

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Toland Medical College.—At the Annual Commencement of this Institution, held Oct. 2d, 1866, the degree of M. D. was conferred on ten candidates.

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Philadelphia College of Pharmacy.—Mr. John M. Maisch has been elected to the chair of Pharmacy in the school of this college, made vacant by the resignation of Prof. Procter, who has filled the chair for many years with signal ability. The new professor is well known as one of the ablest pharma-

centiste in this country, and he will doubtless fully maintain the reputation of the school.

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OBITUARY RECORD.—Died, in Columbia, S. C., Oct. 15th, in the 57th year of his age, R. W. GIBBES, M. D., an eminent practitioner and naturalist.

—— At Chicago, Oct. 10th, of cholera, DANIEL BRAINARD, Professor of Surgery in Rush Medical College.

—— In Cincinnati, Oct. 20th, 1866, aged 60 years, Brig.-Gen. CHARLES S. TRIPLER, Surg. U. S. A., and medical director of the Department of the Lakes. Dr. T. was one of the oldest surgeons in the army, and was highly esteemed for his ability and zeal, as well as for his honourable conduct, during his long and faithful service.

—— At Greenwich, N. J., April 23d, 1866, WILLIAM BELFORD EWING, M. D., in the 90th year of his age.

FOREIGN INTELLIGENCE.

Influence of Sleep on the Appetite and Reparative Powers.—If the sleep be broken, the appetite, with digestion and assimilation, are greatly impaired. Indeed, too much attention cannot be paid to this point, for from the loss of appetite patients rapidly waste, and the reparative parts of the system are greatly lessened, and thus the recovery is greatly retarded. Indeed, the loss of appetite resulting from want of sleep may completely wear out the patient, and be the chief influence causing death. It is thus of the utmost importance to secure to patients sufficient sound and refreshing sleep. This should always be accomplished when possible without the administration of medicines. The ventilation of the room should be carefully looked to, the diet must be carefully regulated, and regard must be paid to the amount of stimulants given. Often sleep is prevented by these latter being administered too late in the evening, or, on the other hand, if patients be very weak, their absence may cause wakefulness, and patients previously restless not unfrequently fall into a refreshing sleep when stimulants are freely administered. All undue excitement before the usual time of sleep must be avoided. If pain prevents sleep, this must be allayed; and if the restlessness be caused by cough, this should be remedied. The cough of phthisical patients not infrequently results from sore-throat. This is then red, injected, and it may be ulcerated. In such cases local applications to the throat are efficient remedies; one of the best is that recommended by Dr. Edward Smith. An eighth or tenth of a grain of morphia dissolved in a drachm of syrup or glycerine should be either painted on the throat with a soft camel's-hair brush, or, which is better, swallowed slowly. This application frequently allays the cough, and allows sleep. If the cough proceed from irritation in the chest, this may often be allayed by counter irritation under either or both clavicles. For this purpose either a mustard poultice, or a blister, or a strong solution of iodine may be applied. Inhalations, moreover, often succeed when given to allay cough: iodine or creasote inhalations are often of greater service than those of simple steam. The patient should be directed to rinse out a jug with boiling water to heat the vessel, and then to pour into it a pint or a pint and a half of boiling water; into this twenty drops of the tincture of iodine or the same quantity of creasote should be dropped. The vessel should then be covered over with a towel, and the patient must put the mouth and nose under the towel. This inhalation should be continued for five or ten minutes. If the cough be paroxysmal and violent, a mixture of laudanum with some chloric ether and tincture of lobelia inflata may often be given with advantage.

Sleep should always be obtained if possible without the use of large doses of opium, for this medicine itself lessens the appetite and often greatly interferes with the other functions of the body. The practitioner has to decide whether greater harm will result from want of sleep or the administration of opium. Patients exhibit great individual peculiarities in respect to the action of opium, and thus the above question can only be decided by a trial of the action of this medicine. With many patients this causes much excitement, sometimes of a pleasant, at other times of a disagreeable kind. With many it destroys the appetite or constipates the bowels; in such cases the opium may inflict even more harm than the want of sleep. On the other hand, some patients under its use fall into a refreshing sleep, and are in no other way affected by its administration. It should be the anxious endeavour of the physician to cure his patient with the smallest amount of medicine possible.—*Med. Times and Gaz.*, April 21, 1866.

Hygienic Precautions against Cholera. The *Gazette des Hôpitaux*, Sept. 22, contains a capital paper on Hygienic Precautions against Cholera, drawn up by the Comité Consultatif d'Hygiène, and addressed to the Minister of the Interior. It states that the mortality caused by the Paris epidemic in 1865 was much lower than that of 1832, 1849, and 1854; that out of the 300 women employed by the Bureau de l'Assistance Publique in washing and cleansing the linen of the cholera patients, not one had died of cholera; and that only two cases had occurred amongst the 911 persons employed as bearers or otherwise at funerals. These good results are attributed to sanitary and hygienic measures public and private. The report proceeds to discuss the merits of most kinds of disinfectants, and for purifying water gives the preference to vegetable charcoal over the permanganate of potass. The form recommended is *braise de boulanger*—Anglicè, "baker's breeze," which, we suppose, is a sort of charcoal remaining from the wooden fagots employed to heat ovens. This substance is directed to be put into the fountains which supply drinking water, so as to form a filtering bed in the proportion of two kilogrammes to every hectolitre of water, and it is to be renewed weekly. The sulphate of iron is the favourite disinfectant for *fosses d'aisance*, drains, etc. We are somewhat surprised to see ammonia recommended as a gaseous disinfectant on the ground of its opposing the growth of mould, microscopic fungi, etc., and of its exercising a favourable influence on those who breathe it. In England we think the contrary in both particulars. Disinfectants, as carbolic acid, etc., should be placed at every aperture, by which air escapes from a cholera ward, so that the disease may not be propagated in the vicinity. Such are some of the points which strike us as novel in this useful paper.—*Med. Times and Gaz.*, Sept. 29, 1866.

Curious Physical and Allotropic Properties of Acetate of Soda.—Prof. JEANNEL, of Bordeaux, presented to the Academy of Sciences, a note illustrative of the "History of Acetate of Soda," in which some curious physical and allotropic properties of this substance are detailed. We have not yet had an opportunity of seeing the paper, but M. Legrand, in the *Union Méd.* for April 14, gives a brief account of some of its contents. From this it appears that crystallized acetate of soda melts in its water of crystallization at a temperature of + 58 Centigrade, and when it is exposed to cold, after being dissolved, it crystallizes at this temperature, which remains stationary during the whole time that the crystallization continues, so that acetate of soda in crystallizing presents a fixed point at 58° C., just as water, in the crystallized state, presents in melting a point at 0° C. Dissolved acetate of soda which is exposed to cold but secluded from the air, either in a vessel that is corked or one that is simply covered over, does not crystallize; but what is in the highest degree surprising is that, while cooling, thus protected from the air without crystallizing, it retains in a latent condition the greatest portion of the caloric which it had absorbed when entering into a state of solution. This caloric reappears and is disengaged when the crystallization of the salt is induced by simply exposing the solution to the air on uncorking or uncovering the vessel which contains it.

This singular property leads to a curious result. The temperature of 60° C. is easily obtainable from the sun's rays concentrated under a glass frame, and therefore the solar heat suffices for the solution of acetate of soda. But if this solution be effected in a corked or covered vessel, it will retain the greater portion of the caloric absorbed, and will restore this when convenient on the vessel being opened. And the quantity of caloric so absorbed is considerable, for 1 kilogramme of the acetate melted and cooled down to 0° C. will disengage, on removing the crystalline condition, sufficient caloric to melt 360 grammes of ice or raise 360 grammes of water from 0° C. to 79° C.

"In fine, here is a means of magazining solar heat. What will come of it in practice? Will human industry be able some time hence to store up for winter a provision of caloric which has been collected during summer? Why not? The observations of M. Jeannel are, as it were, the first steps on this seemingly fantastic path."—*Med. Times and Gaz.*, April 21, 1866.

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Presence of Marine Salt in the Maritime Atmosphere.—M. GILLEBERT-DHERCOURT read a memoir at a recent meeting of the Academy of Medicine on the "Presence of Marine Salt in the Maritime Atmos-

sphere," founded upon a long series of investigations conducted at Monaco. From these he concludes that—1. There exists at the seaside an atmospheric zone which is constantly impregnated with saline particles. 2. The distance from the shore at which these particles are met with at Monaco, justifies our assigning this zone a horizontal extent of at least 400 to 500 metres, and an elevation of at least 70 metres. 3. The proportion of such particles is larger in proportion as the portion of the atmosphere in which they are sought for is near the sea. 4. This results from the pulverization of the water, which takes place on the crest of the wave, and for this it is not necessary that the sea should be very rough. 5. The transport of saline molecules may take place through the winds to such a distance that very apparent traces of sea salt are found in rain water far from the coast. 6. This must not be confounded with the droplets of water which the winds raise from the surface of the waves.—*Med. Times and Gazette*, Oct. 13, 1866.

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Hydatid in the Brain.—On a post-mortem examination of a German governess who died suddenly at Pimlico, a hydatid, the size of a small nut, containing the ova of a tapeworm, was found in the right hemisphere of the brain. The cavities of the brain contained about six ounces of serum, and six or seven hydatids were found in the fourth ventricle.—*Lancet*, Oct. 27, 1866.

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Poisonous Nature of Crude Paraffin Oil.—At a recent meeting of the British Association, Dr. Stevenson Macadam read a paper on the deleterious effects produced on fish in streams by the discharges from paraffin works. The spent acid liquor and the spent soda liquor are the most serious discharges which escape from paraffin oil works, and their influence upon the health and life of fish is much more decided than the paraffin oil itself. The spent acid liquor consists of the sulphuric acid which has been added to the crude oil, accompanied by tar products, including picoline and other basic oils. It is a black tarry liquid of the consistence of molasses, with a somewhat sulphurous odour, and a very small quantity added to water confers upon the latter poisonous properties. In one instance, Dr. Macadam found this spent acid liquor which was collected, somewhat diluted with water, to possess the following powerful effects upon fish: 1. When the liquor was taken by itself, and fish emersed therein, they were dead in five minutes. 2 When the liquor was diluted with three times its volume of good stream water, and fish introduced into the mixture, they were killed in ten minutes. 3. With one of the liquid and twenty of water the fish died in fifteen minutes. 4 One of the liquor and hundred of water killed the fish in fifteen to twenty minutes. 5. One of the liquid and one thousand of water was poisonous to the fish in two hours: whilst in one of the liquor to ten thousand of water, the fish were not killed by their immersion in the mixed liquid for twenty-four hours, but were apparently sick and prostrate. The spent soda liquor which has been employed in treating the oil which had been previously acted upon by acid, is necessarily decidedly alkaline and caustic in its nature. It has extracted from the oil, and retains in solution, more or less carbolic acid and its homologues, and the poisonous nature of the spent soda liquor is doubtless materially augmented by the presence of these acids. One sample of this soda liquor which was flowing from a paraffin oil work, and which contained extra water, proved destructive to fish in ten minutes; diluted with three parts of water, it killed fish in twenty minutes; with twenty of water, the fish were dead in twenty-five minutes; with one hundred of water, the fish were killed in thirty minutes; diluted with a thousand times its volume of water, the soda liquor was destructive to fish in twenty hours; whilst in ten thousand parts of water the fish were not killed, but were apparently slightly sick. Experiments were also made with crude shale oil and the refined oils obtained therefrom, and with Pennsylvania petroleum and the refined oils extracted from it. The crude shale oil was destructive to fish in the proportion of one of the oil to one thousand of water, in twelve hours. The Pennsylvania petroleum, in the same proportion, did not kill the fish for twenty-four hours. The refined oils acted in a corresponding manner on fish; thus the refined shale oil, in the proportion of one to a thousand of water, killed the fish in twenty-four hours, whilst the refined Pennsylvania oil did not prove destructive till two days.—*British Medical Journal*, Sept. 15, 1866.

Cholera in London.—This epidemic is gradually, but very slowly, abating in London. The number of deaths from the disease during the week ending November 3d was 73, no less than 28 of which occurred in the districts of Woolwich Dockyard and Plumstead. The deaths from diarrhœa during the same week were 28.

The deaths from cholera during the succeeding week, ending Nov. 10, were 67, and from diarrhœa 33; total 100.

The epidemic may be considered as having commenced in the week ending June 24, when 21 deaths from cholera and diarrhœa were reported, and to have reached its maximum in the week ending Aug. 4th, when 1407 deaths from these two diseases were reported. Cholera still lingers in London, although it has prevailed already 24 weeks.

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Paris International Medical Congress for 1867.—The Committee appointed to organize this Congress has issued its conditions and programme. The Congress, which is to last a fortnight, will be opened on the 16th of August under the auspices of the Minister of Public Instruction. National members will contribute each 20 francs, but foreigners who announce their wish to take part in the Congress will be exonerated from all contributions. The Committee, in its programme, proposes seven questions for discussion, and members wishing to propose other subjects than those contained in the programme must communicate their essays to the Committee at least three weeks before the time of meeting. No communication must occupy more than twenty minutes in reading. The Committee proposes the following questions, and has published an elaborate commentary on each in order to illustrate the indications of the points sought to be brought out. 1. The anatomy and pathological physiology of tubercle; tuberculization in different countries and its influence on the general mortality. 2. The general accidents which lead to a fatal termination of surgical operations. 3. Is it possible to propose to the various governments some efficacious measures for restraining the propagation of the venereal disease? 4. The influence of the alimentation employed in different countries in the production of certain diseases. 5. On the influence of climate, race, and the different conditions of life on menstruation in different countries. 6. On the acclimatization of European races in hot countries. 7. On the entozoa and entophytes which may be developed in man. All communications respecting the Congress to be addressed to M. Jaccoud, Secretary, 4 Rue Drouot.

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Paris Faculty of Medicine.—This faculty has commenced its winter Session with the following staff of Professors: MM. Gavarret, Medical Physics; Racle (as substitute for Andral), Pathology and General Therapeutics; Jarjavy, Anatomy; Wurtz, Medical Chemistry; Denonvilliers, Operations and Apparatus; Monneret, Medical Pathology; Richet, Surgical Pathology; Robin, Histology; Bouillaud Bucquoy (as substitute for Guillot) and Fournier (as substitute for Grisolle), Clinical medicine; Houel (as substitute for Jobert), Laugier, Velpeau, and Nélaton, Clinical Surgery; and Depaul, Clinical Midwifery. There are also to be delivered certain supplementary courses of lectures by MM. Roger, Diseases of Children; Lasègue, Mental and Nervous Diseases; Hardy, Diseases of the Skin; and Foucher, Diseases of the Eye.

Five Professors have resigned — viz., MM. Andral, born in 1797; Cruveilhier, born 1791; Trousseau, born in 1801; Jobert, born in 1800; and Piorry, born in 1794. M. Trousseau gives the following acount of his resignation:—

"When, well nigh thirty years ago, I was nominated a Professor, and went to call upon Orfila, who was one of my judges (the *concours* then existing in full activity), he said to me: 'Will you have the courage to do what I have decided upon doing? I am one of the most popular of the Professors of the Faculty, and in all probability shall continue to be so for a good while yet, but as soon as I reach my 65th year, without waiting until the public ceases to follow me, I shall retire.' 'I will engage to do the same,' I replied, 'and you may rely upon it I shall not attain caducity in my chair.' I have kept my word; for, having just attained my 65th year, I have sent in my resignation. Let younger men come on, and if we all acted thus, our Faculty, though deprived of that grand institution the *concours*, would recover its former splendour. The labour of practice is already oppressive for more than sexagenarian shoulders; that of teaching is impossible."

The Minister of Public Instruction has announced his intention of immediately filling up the vacant chairs, and requests all candidates to at once send in a statement of claims and qualifications, with an account of the work they have done and of the books they have published. Permutation of chair, a practice much decried by the French Medical reformers, will be put into force; and it is said that M. Monneret will in this way exchange his chair of internal pathology for that of clinical Medicine, and M. Gosselin will take that of clinical Surgery in place of his chair of external pathology, which will be given to M. Broca.

The session was opened on the 3d of November, with the accustomed address of the dean and the usual panegyric on some illustrious deceased medical luminary. M. Wurtz, the dean, spoke very sensibly, and announced various improvements, among which is to be noted a laboratory for practical physiology. His advice to the pupils was extremely good. Professor Jarjavay then gave a vivid and eloquent sketch of the life and career of Malgaigne, whose works and deeds are so well known through the medical world. Both these excellent discourses were listened to by the most unruly, wild, rude, and noisy crowd of pupils, who have, as last year, stamped themselves as men regardless of the age, merit, and high standing of their professors. Their conduct is, by *L'Union Médicale*, denounced as thoroughly unworthy of gentlemen; and the same journal states that these introductory meetings will, owing to such scandalous behaviour, very probably be given up.

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Medical Students in London.—The *Lancet* (Oct. 27, 1866) states that "the number of entries at the several medical schools this year is above that of several preceding years. Notwithstanding the enforcement of a preliminary examination upon those who enrol themselves as medical students, their number falls but little short of that of the years preceeding 1860, when the great rush of candidates for the profession took place. The number of members of the profession in Great Britain has decidedly diminished during the past few years, but this must be due more to the numerous openings for young medical men in India and the colonies, than from any dearth in the supply of medical students, since, with over a thousand pursuing their studies in London alone, the vacancies in the profession must be rapidly filled up."

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Mortality Returns in Paris for 1865.—Together with a meteorological chart for Paris in 1865, Dr. VACHER has just published a supplement to the Registration Report for March, 1865, issued by Baron Haussmann, which furnishes a summary of the deaths that occurred in the twenty *arrondissements* of that city during 1865. The total of these amounted to 51,285, of which 26,339 were males and 24,946 females. Of this number, 22,926 were natives of Paris, and 28,359 were born elsewhere. Of the deaths, 37,428 took place *à domicile*, 13,482 in the hospitals, and 124 in the prisons, 251 bodies having been deposited at the Morgue. As to the causes of the deaths, 1162 of these took place from typhoid fever, 765 from smallpox, 945 from croup and diphtheria, 6591 from cholera, and 1568 from other zymotic diseases, making a total of deaths from zymotic diseases of 11,031, or 21.4 per cent. Cancer furnished 1494 deaths, phthisis 8399, and other constitutional diseases 535, the deaths from these causes altogether amounting to 10,428, or 20.3 per cent. Diseases of the heart caused 1458 deaths; of the lungs, 7536; of the brain, 6653; of the digestive canal, 9820; and of the urinary apparatus, 686. There were 706 suicides, 780 deaths from accidents due to carriages and other causes, while the total of 51,285 is completed by 5,187 unclassified deaths. The following years have been marked in Paris by an exceptional amount of mortality: 1709 (famine), when there were 29,288 deaths; 1794 (famine and executions), 30,388; 1814 (typhus and the battle of Paris), 33,116; 1832 (cholera), 44,463; 1849 (cholera) 48,122; 1854 (cholera), 40,968; and 1865 (cholera), 51,285 deaths.

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The Boundou Poison.—At the meeting of the Academy of Sciences of Paris, MM. PÉCHOLIER and SAINTPIERRE reported the results of their experiments on this substance, derived from a shrub of the *Apocynea*, and which is employed by the Africans on the Gaboon in an ordeal liquor. The Boundou contains a poisonous principle soluble in water and alcohol, and produces an action on the sensitive nervous system analogous to that of nux vomica. When administered by the stomach or by the endermic method,

it produces at first an augmentation of the number of inspirations and cardiac pulsations, and afterwards a considerable diminution of those movements. It causes an exaggeration of sensibility, next tetanic convulsions, and finally insensibility, paralysis, and death. Its action on the motor nervous system is only secondary, and it does not affect the contractility of the muscular system. It is not a poison of the heart, which, on the contrary, continues to beat for a long time after death. These results were obtained from administration of the poison to rabbits, a dog, and frogs. In some cases the animal slowly recovered. This may be the case sometimes with man, and the Africans regard those champions in the judicial duels who escape from the deadly influence of the Boundou poison as recalled to life by the justice of God demonstrating their innocence.—*Med. Times and Gaz.*, Nov. 17, 1866.

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A Novel Infant's Nursery.—An old stable with 100 infants in the horse-troughs and hay-cribs is rather a novelty, but it is seen in the locality of Union-street, Borough-road, London. The work has been undertaken by the Rev. George Aldington, who has secured an old stable to form a nursery, and has fitted it up for taking care of the young children of women who are obliged to go out to char or work away from home. —*Med. Press and Circular*, Oct. 31, 1866.

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Glorious War.—The Commissioners despatched to the lazarets and field hospitals by the Patriotic Help Association (Hilfsverein) of Vienna has published an interesting report. They draw a pitiable picture of the condition of the peasantry in Northern Bohemia. For six months their country has been occupied by great armies. The peasant's food has been devoured, his field laid waste, his house burnt or torn down and laid in ruins. They declare that the dead were left unburied in many places, and that the poisoned air destroyed the living. Nearly all the amputations made by the Prussian military surgeons ended fatally, but no difference was made in the treatment of Austrian and Prussian wounded by the medical men. They found the condition of the hospitals in all that related to nursing and medical attendance "deplorable." The Commission started to Brünn on the 1st of August with fifteen wagon-loads of medical comforts. In Wilkersdorf they found a Prussian company as a guard to a cholera hospital. The pestilence was so bad that in a short time 450 had died out of 700 patients, and the officer in command said, "I hope in Heaven we shall soon leave this, for my sick will all be dead in a few days." At Pardubitz they found seven wounded Austrian officers, who were getting well in airy, well-shaded tents. At Königgrätz itself they found the hospitals overstocked and short of what was needed. In one house were 115 wounded officers, and in another were 198 more. They needed splints, lint, bandages, medicine, lotions, as well as tobacco and wine. On the 9th the Commissioners visited Rosnitz, Westar, Sadowa, Nechanitz, and Hradek, and describe with horror and astonishment the condition of the country. The hands and feet of the dead were sticking out of the hasty graves. As to the hospitals in these places, the Commissioners declare all appliances and necessaries were deficient. The Prussian doctors deplored their want of success in amputations. Many of the wounded had been left forty-eight hours on the field without help, and were in the most unfavourable condition for treatment by the knife. On the 14th they visited Jaromierz, Skalitz, Nachod, etc., and all the hospitals up to Trautenau. In all cases their supplies were most welcome. The report affords a terrible peep behind the scenes of a great battle—the *après*, when the conqueror has moved off with drums and trumpets, and banners flying in the setting sun, and night settles on the dying and the dead.—*British Medical Journal*, Sept. 15, 1866.

—

Prizes of the Royal College of Surgeons of England.—The Council of the Royal College of Surgeons of England has just awarded one of the Jacksonian Prizes of twenty guineas to Mr. William Paul Swain, of Davenport, a Member of the College, for his essay on "The diseased conditions of the knee-joint which require amputation of the limb, and of those conditions which are favourable for excision of the joint, with an explanation of the relative advantages of both operations as far as can be ascertained by cases properly authenticated." Mr. Swain was a pupil of King's College. For the other Jacksonian prize on the relative value of the various modes of treatment of

popliteal aneurism, it does not appear there were any competitors. The following are the subjects for the Jacksonian prizes of the present year—viz., "Ovariotomy: pathology and diagnosis of cases suitable for this operation, with the best method of performing it, and the results of recorded cases; and on "Fractures into joints: their modes of union, with the treatment and result."—*Med. Times and Gaz.*, April 21, 1866.

—

Sir Charles Hastings Fund.—With a view to perpetuate the memory of the late Sir Chas. Hastings, it has been determined to raise a special fund for the purpose of founding a medal, and supplementing it with a sum of money, to be awarded for distinguished service in medical science to any member of the profession in any part of the world. A considerable sum has been already collected, and we feel assured that a testimonial worthy of the excellent founder of the British Medical Association will be established.—*Lancet*, Sept. 22, 1866.

—

A Live Gorilla.—M. de Quatrefages announced to the Academy of Sciences, that Admiral Fleurian has succeeded in bringing over to France a young live gorilla. The little brute has the free range of the house, and is employed in observing as much as it is the object of observation.

—

Museum of the Royal College of Surgeons.—Mr. Flower, the indefatigable conservitor of this museum has been exploring the osteological stores which have been accumulating for many years in the subterranean apartments of the college and has been rewarded by the discovery of the skeleton of that rare and probably extinct bird, the great auk (*Ala impennis*) of which only three other skeletons are known to exist in Europe, and none so perfect as that now at the college. Among other interesting additions to the museum, we may mention a skeleton of the awantibo (*Arctocebus Madagascarensis*) a lemuroid animal, from old Calabar; and the skeleton of another very rare animal presenting several remarkable peculiarities of conformation, the aye-aye (*Cheiromys Madagascarensis*).

—

The Head-Quarters of Drunkenness.—Liverpool has been pronounced the most drunken town in England. And it is true. Its extreme drunkenness arrests the attention of the judges, its pauperism weighs heavily upon the ratepayers; its rate, fifty-six per thousand, appalling. The drunken cases dealt summarily with by the magistrates are set down at the annual rate of one in thirty-three of the population. The habitual drunkards, in their periodic appearances before the bench, form an endless chain of besotted creatures. According to the recently published judicial statistics there are 3,100 habitual drunkards in Liverpool, and they are about equally divided as to sexes.—*British Medical Journal*, Sept. 1866, from *Liverpool Albion.*

—

M. Jobert de Lamballe.—The death of this eminent surgeon has been erroneously announced in some journals. At the latest dates (Nov. 15th) he was still in an insane asylum, but his condition had somewhat improved.

—

Obituary Record.—Died, in Paris, Oct. 6th, of diabetes, aged 77 years, M. Rostan, Professor of Clinical Medicine, and one of the most celebrated physicians of the French capital. M. Rostan was at the head of that school in France, which referred all diseases to organic changes. He was the great rival of Broussais, and has enriched our science with many useful works. As a lecturer he was a great favourite, and retained his popularity with several generations of students.

—— At Nice, Nov. 9th, 1866, M. Natalis Guillot, Professor of Clinical Medicine in the Faculty of Medicine of Paris.

—— At Sydenham, of pleuro-pneumonia, George Hilard Barlow, M. D., one of the physicians to Guy's Hospital, aged 60 years.

The list of physicians who have fallen martyrs to their devotion while succouring the sufferers from cholera, is a very long one. Vienna has lost M. le Baron Wattman-Beauliere, Surgeon to the Emperor, Dr. Franz Liharzik, Dr. J. Weidinger and Dr. Frese, Emeritus Professor of Zoology in the University. Leipsic has lost Dr. G. Gunther, chief of the surgical clinic of the hospital of that city. Breslau has lost Dr. Klopsch, distinguished by his writings on orthopædy. In the short German war no less than eleven Prussian physicians died from cholera.

The death is announced of Lady Holland, the wife of Sir Henry Holland, and the favourite daughter of Sidney Smith, no small portion of whose brilliant wit and literary power she inherited.

PROSPECTUS FOR 1867.

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INDEX.

Acetate of soda, curious physical and allotropic properties of, 224
Actual cautery, charcoal pegs for, 209
Adams, ligature of external iliac, 26
Addison's disease, 173, 193
Advertisements, physician's, 114
Albumen of blood in cholera, 109
Albuminous urine in cholera, 41
Alcohol from mulberries, 78
Alcoholized milk for infants, 117
Althaus, nature of supposed choleraic poison, 202
American Medical Association, 59, 93, 113, 135
——— Pharmaceutical Association, 8
Amiens, Visit of the French Empress to cholera hospitals at, 139
Amputation at hip-joint, 99
Anæsthesia, local, 77, 99, 170
Anæsthetic agent, new, 60
Aneurism, compression in, 8
——— of external iliac artery, ligature of vessel with silver wire, 199
———, popliteal; ligature of femoral artery with silver wire, 200
Animals cannot live after being frozen, 78
Antagonism of races, 138
Aphides, reproduction of, 188
Astley Cooper Prize, 63
Atlanta Medical College, 113, 185
Atmosphere, germs in, 210
———, maritime, marine salt in, 224
Auenbrugger, 186
Austria, adhesion to neutrality of surgeons, 171
Autopsies, how to make them odious, 206

Barbier, deodorizing properties of ground coffee, 117
Barwell, excision of hip-joint, 177
Barlow, pathology of cholera, 144
Beigel, hypodermic injections of warm water in cholera, 201
Belcher, hysterical tetanus, 198
Belladonna, endermic poisoning by, 9
Bellevue Hospital Medical College, 59
Bence Jones, discovery of a quinia-like substance in animal body, 76
Bengal, cinchona plantation in, 47
Berkshire Medical College, 7
Berlin, smallpox in, 11
Blackman, legal liability of surgeons, 75
Blisters in acute rheumatism, 119
Bone setter convicted of manslaughter, 191
Boundou poison, 227
Bowerbank, treatment of premonitory diarrhœa, 108
——— of cholera, 108
———, quarantine and cholera, 109
Boylston Prizes, 59
Brain, hydatid in, 225
Bread, superior utility of made of whole meal, 208
Brest, cholera at, 53
British Medical Association, 171
Broca, galvano-caustic knife, 116
Bruns, stomatoscope, 62
Buttura, diabetes, 8

Cæsarean section under local anæsthesia, 170
Calcutta, smallpox in, 12
California, ovariotomy in, 185
Cancer of uterus, iodoform in, 57
Cattle plague, 79, 138
Cazenave, death from fear of an operation, 170
Charcoal pegs for actual cautery, 209
Charleston, smallpox in, 98
Chicago Medical College, 59
Child, production of organisms in closed vessels, 46
Chlorine fumigations in cholera, 21
Chloroform, death from, 8, 28, 45, 98, 207
———, extensive use of, 45
———, injurious effects of, 208
Cholera, albuminous urine in, 41
———, albumen of blood in, 109
———, approach to America, 74
——— in Brest, 53
———, chlorine fumigations in, 21
———, conference report of, 158
——— on board steamer England, 90, 167
———, Richardson on origin, causes, and prevention of, 156
———, experimental researches on, 41
——— in Germany, 92
——— hospitals, 185
——— hospital at Amiens, visit of French Empress to, 139
———, hygienic precautions against, 224
———, hypodermic injections of warm water in, 201
———, ice bags in, 4, 179

Cholera, Johnson, pathology and treatment of, 1, 17, 33, 49, 65,
——— at Liverpool, 90, 110
——— in New York, 91
———, New York Academy of Medicine on, 169
———, non-contagiousness of, 104
——— in Paris, 42
———, pathological anatomy of, 141
———, pathology of, 81, 101, 121, 141, 144
——— patients, isolation of, 21
———, Pettenkofer's theory of propagation of, 40
———, physiological formula of, 151
———, preparations for, 203
———, progress of, 6, 53, 110, 132, 166, 168, 182, 183, 203
———, prophylactic arrest of, 107
——— in Prussian and Austrian armies, 119
——— and quarantine, 92, 109
———, remedies for, 20, 41, 179
———, saline injections in, 182
———, treatment of, 82, 108, 151, 160
———, treatment of in London hospitals, 163, 179
———, treatment in Paris hospitals, 180
Choleraic poison, nature of, 202
Cinchona plantation in Bengal, 47
——— bark, Indian, 47
Clark, non-contagiousness of cholera, 104
Clinical Lectures—
West on children's diseases, 22
Locomotive ataxy, 42
Greenhow, Addison's disease, 173, 193
Cloez, oxidation of fatty vegetable oils, 31
Coffee, deodorizing properties of, 117
———, Liebig on, 30
College of Physicians, Library of, 110
———————, Mütter Pathological Museum of, 44
Columbia College, College of Physicians and Surgeons, 59, 112, 113
Compression in aneurism, 8
Connecticut Medical Society, prize question, of, 206
Contractile cells of syphilitic pustules, 46
Convention of Delegates of Medical Colleges, 97
Crude paraffine oil, poisonous nature of, 225
Cryptogamous, origin of intermittent fevers, 185
Cyanide of potassium, poisoning by, 111

Dancel, influence of water in production of milk, 46
Degeneration of human race in cities, 137
Deodorizing properties of ground coffee, 117
Desecration of London graveyards, 190
Desormeaux's monograph on endoscope, 8
Diarrhœa, treatment of premonitory, 108
Diabetes, 8
Diornis, 190
Dresden hospitals, pyæmia in, 198

Edinburgh Medical Journal, 191
Electricity, great prize in, 139
Endermic poisoning by belladonna, 9
Endoscope, Desormeaux on, 8
England, cholera in, 167, 203
English hospital in Paris, 15
Epidemiological Society, cholera hospitals, 156, 185
Etherization, 29, 45
Evans, American Sanitary Museum, 27
Excision of hip-joint, 177
Extensive injuries, repair of, 6
External iliac ligated with silver wire, 199
———————, ligature of, 26

Faculty of Medicine of University of Victoria College, 206
Farr, address on public health, 213
Fear of an operation, death from, 170
Femoral artery ligated with silver wire, 200
Fernand-Papillon, albumen of blood in cholera, 109
Ferrini, therapeutic action of sulphites, 15
Fiedler, trichinæ, 186
Fistula in ano, 13
Flannel belts in French army, 209
Flint's Practice of Medicine, 135
Fossil animal, 63
French codex, new edition of, 211
——— physicians, honours to, 15
Fuster, raw flesh and brandy in consumption, 169

Gallard, ventilation of hospitals, 10
Galvano-caustic knife, 116
Galveston Medical College, 97
Gason's treatment of cholera, 166
Germs in atmosphere, 210
Gleet, medicated powders, 170
Glorious war, 228
Godard prize, 15
Gonorrhœa, novel treatment of, 178, 184
Gorilla, live one, 229
Greenhow, Addison's disease, 173, 193
Guerin, wounds cured by pneumatic occlusion, 116

Harvard University, 45
Headquarters of drunkenness, 229
Hip-joint, amputated at, 99
———, excision of, 177
Hospitals, ventilation of, 10
Human race, degeneration of in cities, 137
Hydatid in brain, 225
Hygiene, council of, Citizens' Association of New York, 26
——— public, address on, 213
Hygienic precautions against cholera, 224
Hypodermic injections of warm water in cholera, 201
Hysterical tetanus, 198

Ice bags in cholera, 4, 179
Infants' nursery, novel one, 228
Influenza in London, 99
Insects fabricators of iron, 211
———, muscular power of, 46
Insufflation of medicated powders in gleet, 170, 184
Intermittent fevers, cryptogamous origin of, 185
International Medical Congress, 138, 226
——————— Ophthalmological Congress, 139

Iodoform, its uses, 57
Irish lunatics, 11
Iron, insects fabricators of, 211
Isolation of cholera patients, 21
Italian registration returns, 187

Jaw from the Trou de la Naulette, 189
Jeannet, curious physical and allotropic properties of acetate of soda, 224
Jefferson Medical College, 45, 58, 59
Jejunum, laceration from a fall, 7
Jobert de Lamballe, 31, 229
Johnson, pathology and treatment of cholera, 1, 17, 33, 49, 65
Journals, new medical, 60, 76

Kerosolene as a local anæsthetic, 61
Klopsch, trichinæ in cancerous tumour, 115

Labbe, ovariotomy, 15
Lady volunteer nurse, 171
Lankester's address, 53, 70
Lane, syphilization, 61
Laryngoscope, needle in base of tongue diagnosed by, 133
Lead, poisoning by, 112
Liebig, coffee making, 30
Life, low forms of, 188
Ligature of external iliac, 26
——— silver wire, 199, 200
Light, action of, 47
Liquor of Villate, 114
Literary men and doctors, 15
Liverpool, cholera in, 90, 110
Locomotive ataxy, lecture on, 42
London, East, social and moral condition of population in, 170
——— graveyards, 190
——— hospitals, treatment of cholera in, 163, 179
———, influenza in, 99
———, medical student in, 227
———, mortality of, 119
———, street accidents in, 68
———, syphilization in, 61
Ludlow, death from chloroform and ether, 207
Lunacy in Scotland, 11

Macadam, poisonous nature of crude paraffine oil, 225
MacCormac, prophylactic arrest of cholera, 107
——— on whole meal bread, 208
Maclean, treatment of cholera, 82
Malles, medicated powders in gleet, 170
Mammoth, discovery of, 138
Marine salt in maritime atmosphere, 224
Massachusetts Medical College, 59, 135
Mattei, diagnosis of pregnancy, 136
Meat, new mode of preserving, 187
Medical corps U. S. Army, rules for entering, 183
——— journalism, 45, 60, 76
——— men, honours to, 47, 171
——— profession, status of, 209
——— students in London, 227
Melsens, prevention of baneful effects of nicotine, 115
Menstruation and abortion at 72 years, 137
Miami Medical College, 75
Michaux, extirpation of scapula, 115
Michigan, University of, 7, 222
Middlesex hospital, 63
Milk, influence of water in production of, 46
Mortality, returns of Paris, 227
Mulberries, alcohol from, 78
Muscular power of insects, 46
Museum, Royal College of Surgeons, additions to, 229
Mushrooms, poisonous principle of, 117
Mütter lectureship, 59
——— Pathological Museum, 44

Naples, students in, 63
Necrosis of lower jaw from application of tobacco oil to a carious tooth, 134
Neuralgia, iodoform in, 57
New Hampshire Medical Institution, 7, 222
Newman, Cæsarean section, 170
New Orleans Medical Journal, 8
——— School of Medicine, 206
New York Academy of Medicine on cholera, 169
———, cholera in, 91, 110
———, Citizens' Association of, 26
Nicotine, prevention of baneful effects of, 115

Obituary record, 31, 45, 47, 60, 63, 98, 99, 114, 119, 139, 171, 185, 207, 211, 223, 229
Ohio, Medical College of, 75
Organisms, production of in closed vessels, 46
O'Rielly, treatment of gleet, 184
Ovariotomy, 15, 185
Oxidation of fatty vegetable oils, 31
Oxygen, researches on, 78
Ozone, 117

Paris, cholera in, 42
——, English hospital in, 15
——— Faculty of Medicine, 211, 226
——, health of, 53, 227
——— hospitals, treatment of cholera in, 180
——— international congress, 138, 226
——, mortality in maternity hospitals, 63
——, smallpox in, 63
Pennsylvania, Citizens' Association of, 136
———, Medical Society of, 75, 136
———, University of, 7, 58, 59
Petrequin, etherization, 29
Pettenkofer's theory of propagation of cholera, 40
Pharaoh's serpents, 10
Philadelphia College of Pharmacy, 222
——— County Medical Society, 44
———, health of, 98, 110, 134, 168, 183, 206, 222
———, library of College of Physicians of, 110
———, medical instruction in, 58
Phthisis, raw flesh and brandy in, 169
Physician's visiting list, 185
Plateau, muscular power of insects, 46
Pneumatic occlusion, wounds treated by, 116
Poisonous principle of mushrooms, 117

Popliteal aneurism, ligature of femoral artery with silver wire, 200
Pouchet, animals cannot live after being frozen, 78
Pregnancy, diagnosis of, 136
Premonitory diarrhœa, treatment of, 108
Preston Retreat, 97
Prize question Connecticut Medical Society, 206
——— in electricity, 139
——— of the Medical Society of the State of Pennsylvania, 136
Prizes, Imperial Academy of Medicine, 119
——— Royal College of Surgeons of England, 228
Prion, menstruation and abortion at 72 years, 137
Pyæmia in Dresden hospitals, 198

Quarantine and cholera, 92, 109
Quinia-like substance in animal body, 76

Races, antagonism of, 138
Railway surgery, 47
Raw flesh and brandy in phthisis, 169
Reade, ice bags in cholera, 179
Redwood, new mode of preserving meat, 187
Rheumatism, blisters in acute, 119
Richardson's local anæsthesia, 77, 99
Richardson, mode of applying caustics and styptics to raw surfaces, 99
———, physiological formula of cholera, 151
———, on origin, cause, and prevention of cholera, 156
Rinderpest, 79
Robinet, ventilation of sewers, 10
Roseola cholerica, 166
Royal College of Surgeons, additions to museum of, 229
Rush Medical College, 59

Saline injections in cholera, 182
Sanitary Museum, 27
Scapula, extirpation of, 115
Schonbein, researches on oxygen, 78
Scotland, lunatics in, 11
Sewage, value of, 188
Sewers, ventilation of, 10
Sickness in Prussian and Austrian armies, 119
Sieves, economical, 113
Silver wire ligature, 199, 200
Simon, alcoholized milk for infants, 117
Sir Charles Hastings fund, 229
Sleep, influence of on appetite and reparative powers, 223
Smallpox in Berlin, 11
——— in Calcutta, 12
——— in Charleston, 98
——— in Paris, 63
Soule University, 59
South Carolina, Medical College of State of, 75
Spirits, fictitious, 15
Steamer England, cholera on board of, 90
Stevens' triennial prize, 112
Stimulants, increased use of in London hospitals, 30
St. Louis Medical College, 75
Stomatoscope, 62
Street accidents in London, 63
Suicides in Vienna, 138
Sulphites, therapeutic action of, 15
Summer, approaching, 99
Syphilis, iodoform in, 57
Syphilitic pustules, contractile cells, 46
Syphilization in London, 61
Sydenham Society, 113

Tarnier, mortality in Paris maternity hospitals, 63
Thompson's treatment of gonorrhœa and gleet, 178
Tobacco oil, caries from application of to a hollow tooth, 134
Toland Medical College, 222
Tongue, transfixion of base of by a needle, 133
Trichina, 10, 60, 61, 74, 186
——— in cancerous tumour, 115
Trichiniasis, epidemic of, 29, 79
———, in Iowa, 111
Tuberculous matter, inoculation of, 46

Unequal justice, 139
United States, progress of cholera in, 168
University of Buffalo, 59
——— Medical College, New York, destruction of building of, 113
——— of Michigan, 7
——— of Nashville, 185
——— of city of New York, 59
——— of Pennsylvania, 7, 58, 59

Vaccine matter from cow, 9
Ventilation of hospitals, 10
——— of sewers, 10
Vienna, suicides in, 138
Villemin, inoculation of tuberculous matter, 46
Villate, liquor of, 114
Virchow, trichina, 10

Water, influence of in production of milk, 46
West, clinical lecture on study of children's diseases, 22
Western Medical Colleges, convention of delegates from, 97
Wounds cured by pneumatic occlusion, 116

Yale College, 59

commends the manful discharge of duty as the best remedy against "sinkings and oppressions of the spirits." The action of heat, whether it be direct solar, or a simply elevated temperature, is evidently the prime motor of heat-apoplexy, as the other causative conditions are chiefly predisposing, though in this respect their influence can hardly be over-estimated. The observable phenomena will vary according to the particular part of the nervous system, which especially succumbs under the morbid influence. In the worst cases where death occurs almost instantaneously the medulla oblongata is probably the focus of morbid action. Death ensues from arrest of the respiratory changes in consequence of the paresis of the vagi, and the lungs are found intensely engorged, even to the production of apoplectic extravasation, while the brain is almost free from lesion. In other cases of slower progress where the disorder commences with feverish debility in the morning, and terminates in stupor in the afternoon, the cerebral hemispheres are more especially affected, their vessels are found exceedingly congested, and those of the lungs less. Assuming the paresis to be primary, cerebral congestion ensues, according to the well-known law that impairment of function is intimately connected with impediment to the free transit of blood through the part. Thus the lungs become congested in apnœa. The circumstance that in the milder seizures the phenomena take the form of fever, either ardent, or remittent, or intermittent, points to the strong probability that in these instances the vaso-motor nervous system is specially implicated.

I subjoin here the notes of two cases of this affection as it has occurred in my experience:—

No. 15.—M. G., f., æt. 14, ad. July 18th. Ill six days; was out in a field, sitting in the sun, carrying children, suddenly became faint, and got pain in the head and vomiting, and has had vomiting ever since. She is always wanting *to lie down*, and complaining of her head. Skin cool. Pulse soft, open. Bowels very costive. Epigastrium not tender With tannin and mineral acids the sickness quite ceased in a week, and she was much better.

No. 16.—E. L., f., æt. 24, ad. Oct. 25th. Ill since the beginning of August. "She went reaping without a bonnet, and the sun affected her brains." It was about 2-3 P.M. when she was attacked, on a hot day with a bright sun. She was taken up senseless, and remained insensible for one whole month, during which her head was blistered. Legs have been much swelled, but are not so now. Has not suffered with pain in head. After the first attack she used to get slightly chilly in the afternoon, the chill was soon succeeded by much fever and cold sweats. Abdomen has been much swelled, is much distended with flatus now. At present she feels very weak and languid, is very anæmic. Has much nausea, can take no food. Very thirsty. B. regular. Urine sometimes red, sometimes pale. Head not hot, is rather better when lying down, "feels lost" when she gets up. Loses consciousness at times, finds her memory failing, spirits very low. Has dreadful cold sweats at night. The fever affects somewhat a tertian type. Skin cool.

Pulse not particularly weak. She has just returned from Kent, where she was taken ill. She was ordered quinine *ter die* with mercurial alteratives *alt. noct ;* under which she improved a little, and discontinued attendance.

REMARKS.—In both these cases the phenomena are a sudden cerebral "coup" followed by failure of functional power, and stomach disturbance. The second case is much the more severe, the prostration was very prolonged and considerable, and the tendency of the disorder to assume the character of malarious fever apparent. It seems plain that whatever amount of hyperæmia of the brain may have occurred, the history is by no means that of mere cerebral congestion, but rather reminds one of the results of concussion. If we bear in mind the primary exhausting action of heat, it will not be difficult to conceive how an excessive application of this agent may produce such phenomena as above detailed. The occurrence of aguish disorder as the result of severe nervous prostration is highly significant as to the especial implication of the nervous system in malarious disease.

The *after symptoms*, as Sir R. Martin well remarks, "are of extreme interest, and they, as well as the more chronic and subdued influence of insolation, throw much light on the pathology of the disease." The list which he gives appears to me remarkably to confirm the opinion I have expressed that heat-apoplexy essentially consists in a functional paralysis of one or more great nervous centres. It runs as follows: "(1) Severe mental depression with sense of weariness along the spine. (2) Impression of the sun being always shining on the person with tinnitus aurium. (3) Distressing formication sometimes accompanied by a peculiar and general eruption and desquamation of the skin. (4) Deafness more or less severe with impaired vision, and inability to use the eyes in reading and writing. (5) Various paralytic affections, more or less general, as hemiplegia, and local palsies, as of the eyelids, cheeks, or upper extremities, with and without loss of sensation. Heaving and difficult breathing. (6) Distressing hysterical states of the nervous system, with absence of self-control in laughing and crying—the paroxysms being followed by great prostration of nervous power. (7) Interruption to natural sleep with incapacity for any kind of business. (8) Impression of alarm on any sudden movement of the body, and upon the occurrence of sudden noises. (9) Sudden epileptiform seizures, without loss of consciousness, followed by great nervous prostration." The foregoing have been observed in sufferers who have returned to England. In India, he proceeds, "we are familiar with the acute sequelæ to sunstroke, as ardent fever with acute delirium, remittent and intermittent fevers complicated with dysenteries, hepatic inflammations and congestions." These statements merit the most careful consideration, not only from the light they throw on the nature of heat-apoplexy, but from that which they shed on the pathology of a multitude of nervous disorders. Any man of experience in the manifold disorders of jaded and exhausted nervous systems will recognize at once how close is the resemblance between the results of tropical heat, and those produced by the ordinary causes in operation among

the struggling multitudes of our large towns. It may be observed, (I.) That the most abiding results of heat-apoplexy are almost all referable to impaired functional energy of the cerebro-spinal system. (II.) That this impairment shows itself either in motor paralysis (5), sensory paralysis (4 and 5), either of common or special sensation, hyper- and dysæsthesia of the nerves of common and special sense (2 and 3), in debility and undue excitability of the emotional centres (6, 8, 9), and in similar states of the cerebral hemispheres and spinal cord (1, 7). (III.) The earlier sequelæ appear as the well-known consequences of vaso-motor nerve paralysis. The picture which Sir R. Martin gives of the manifold and varying sequelæ of sunstroke is altogether unlike that presented by actual organic disease. It is unlike in its causation, its non-progressive character, the inconstancy of the phenomena, and in the "juvantia."

The occurrence of eruption in connection with, and apparently as the result of cutaneous dysæsthesia is of much interest, and probably may be explained as the result of vaso-motor nerves becoming implicated in the morbid action. It will be remembered that one of the results of division of the sympathetic in some animals is cutaneous eruption. Romberg describes in the same way the development of prurigo from pruritus, a lichenoid eruption from a mere nerve affection. The action of summer heat in promoting the occurrence of lichen urticatus is familiar to many of us. The effects of heat-apoplexy illustrate very forcibly the development of morbid excitability and hyperæsthesia simultaneously with impairment of motor power. It is difficult to say how far malarious poison is concerned in producing the phenomena we have been considering, probably it acts chiefly as a predisposing cause. The parallel, however, between these two morbid agencies is extremely close, and it is curious and instructive to observe that their results are sometimes identical. The cause of this correspondence no doubt lies in the fact that both act principally on and through the nervous system, and that in the way of paralysing its power. Admitting cholera poison to be a form of malaria, of which I think there is some notable evidence, we find in some recorded epidemics as sudden a death-stroke as can be occasioned by heat; malaria will produce various forms of paralysis and epileptoid attacks, cutaneous eruption, and mental depression, besides the well-known fevers. This however may be said that malaria affects more specially the vaso-motor system, and heat the cerebro-spinal.

As an imponderable influence, obscurely though unquestionably related to heat and malaria, we may notice electricity in its morbid action on the nervous centres. Dr. Radcliffe states in his lectures[1] that a continuous electrical current of low tension seems to have the power of producing temporary paralysis of a nerve or nervous centre which is traversed by it. Eckhard has shown that if the nerve of a frog's leg prepared for the purpose be included in a galvanic

[1] "Lancet," Feb. 28th, 1863.

current it is impossible to produce contractions in the muscle by acting upon that part of the nerve which lies between the poles. In other words the part of the nerve along which the continuous galvanic current is passing, is paralysed by the action of the current.[1] It is also a fact that the spinal cord may be paralyzed by the same means. If for example the spinal cord of a rabbit be included in the circuit of a voltaic battery the part between the poles may be cut, pricked, torn or even electrified without giving rise either to pain or convulsion. Although the above-mentioned effects are expressly ascribed to low-tension electricity it seems indubitable that a shock of high-tension electricity produces very similar, and even more abiding. Numerous instances are on record in which individuals having been struck by lightning have suffered temporary paralysis of motion, and special or common sensation, from which they recovered either spontaneously, or with the aid of tonic remedies. In these cases there can be I think little question that the nervous tissue is directly paralyzed from some molecular change taking place in its cells or fibres. I once experienced myself a severe shock from a very large Leyden jar, and well remember the overpowering general prostration I experienced, although the shock only passed through my forearm. It is impossible, I think, to conceive that any arterial spasm can explain the effects produced in this and similar instances. Certainly in the case of the frog's nerve dissected out, and remaining attached to the muscle above mentioned, there can be no question of local anæmia as the cause of the paresis. The "juvantia" also, as in Dr. Watson's case,[2] where steel and tonic treatment effected a speedy cure of paraplegia in a girl who had been struck by lightning, decidedly indicate that the paresis from this cause is one of simple functional debility.

Venereal excess is a powerful cause of cerebral paresis, as well as of spinal, few exceed it. Good Hufeland says, "it is proved beyond all doubt that nothing renders the mind so incapable of noble and exalted sensations, destroys so much all its firmness and powers, and relaxes the whole being as this dissipation." It is not too much to affirm that a state bordering on dementia has often been produced by sexual excess, and perhaps still more frequently by solitary vice. Esquirol says that immoral habits and the use of mercury are very frequently productive of that deplorable species of paralysis which becomes complicated with dementia and monomania.[3] It is somewhat remarkable that sexual excitement should have so pernicious an effect, for the nerves of the genital organs are by no means large, their origin is remote from the brain, and the loss of excreted matter can

[1] On one occasion I went to sleep with the negative pole of a 40 links Pulvermacher's chain in my hand, the positive being applied to my back. In the course of the night I found my hand was quite numb, but after removing the chain the numbness soon went off.

[2] "Lectures," vol. i. p. 382.

[3] *V.* Ritchie on same subject, "Lancet," Feb., March, 1861.

hardly be regarded as any serious drain on the system. The only way that I can see of accounting for the remarkable collapse which attends on any abuse of the generative faculty is, that owing to the intimate commissural connections between the lumbar enlargement of the cord, where the pudic nerves are implanted, and the superior and nobler nervous centres, the intense excitation of even a small and remote centre is communicated to the others, which as this subsides fall as much below as they have previously been stimulated above par. The depression is proportional to the previous excitement.

Influenza is a common enough visitant among us, and familiar though its phenomena be, they seem to me of no little interest. That a person should be prostrated, as occasionally happens, almost instantaneously, and remain for some days in profound debility is surely very remarkable. Without speculating on the nature of the cause, let us simply consider how it seems to act. There can be I think no question that the nervous system is the one on which the stroke especially falls, and as little that the encephalic centres are prominently affected. The debility is by no means mere muscular weakness; it is described by Dr. Shapter as "an overwhelming feeling of lassitude and prostration of strength, with in many cases a loss of all muscular power, together with great anxiety of the precordia, and agonizing fears of death." The expression of the countenance is *abattu*. There are pains in every part, sensations as of being sore, beat, and bruised all over. Pain in the temples sometimes prevents rest for several nights. Many observers have noticed the occurrence of neuralgia of the face. Apoplectic and convulsive attacks have occurred in some instances, in some also delirium, in others coma. These citations of the experience of others,[1] coinciding as they do very much with my own, may be considered sufficient proof that the cerebro-spinal centres are chiefly affected by the miasma, and that in a paralyzing way. The catarrhal symptoms are for the most part such as indicate vaso-motor nerve paralysis, and atony of the capillary walls rather than actual tissue irritation. They, as Dr. Watson states, are not so essentially a part of the disorder as the peculiar prostration, since they are occasionally absent. It must appear to every reflecting mind as a very important and thought-exciting circumstance that there should exist such a subtle, undetectable poison, or agency, as this of influenza. Standing as it does quite separate from the exanthemata, it links itself on the one hand closely with some of our commonest disorders, and on the other hand manifests no obscure affinity with pestilences, and with that most widespread of all maladies, malarious fever.[2] The intensity of its operation on the nervous system, and the fact that it is now

[1] *V.* "Annals of Influenza," Syd. Soc., p. 320.

[2] Various good observers, Cleghorn, Petrie, and H. Greenhow, testify to the origin of re- and intermittent fevers from influenzal affection.

as it were domiciled among us, makes it important to take count of it in dealing with a variety of obscure nervous disorders. It is probable that the more we come to know of disease the more we shall find that there exist a few great distinct morbific causes, which by acting on different parts, in different combinations and degrees and with slight modifications give rise to ever-varying forms of morbid action.

The treatment of cerebral paresis must essentially consist in the avoidance or removal of all exciting causes, as well as in the employment of all means that can recreate and invigorate nerve-power. The possibility of the paresis being dependent on remote irritation should be borne in mind. If, however, as is oftenest the case, it is primary and direct, we must endeavour to act on the enfeebled centre itself. Among the means at our command pure and bracing air, generous diet, and healthful mental excitement are perhaps the most powerful. The influence of the latter is often marvellous; it is really curious for any one to observe himself, and note how much more exertion he is capable of when his mind is thoroughly occupied and interested, than when the occupation is distasteful. I always ask my patients who complain of failing power (not of course dependent on organic disease) what recreation they *like*, and *that* I send them to, as the best for them. Under the head of food I may allude to the popular combination of rum and milk as being one of the very best restoratives that can possibly be given. A daily morning dose of it to weakly subjects is of great value, and in cases of an acute kind it may form almost the staple of the nourishment. As to medicines, our ordinary stimulants and tonics must be employed, the drug and the dose being matters for consideration in each individual case. I shall only mention particularly one or two remedies. Strychnia I have come to regard as a truly valuable cerebral toner, its action on the encephalic being not far inferior to that which it exerts on the spinal centres. It is a perfectly safe remedy with due care, and although I have employed it for years very largely I have never seen more than slight inconvenience produced by it, when it disagreed with some patients of unusual susceptibility. It should always be given in solution, and combines very well with quinine and iron. Phosphoretted oil I have used occasionally, but it is apt to cause considerable gastric disorder, and I have had but little encouragement to persevere with it. Dr. Radcliffe has recently spoken highly of the hypophosphites as remedies for states of nervous depression. My own experience of them in phthisis would not lead me to expect much benefit from them. Cod-liver oil is, I think, a remedy of real value, whether it act according to the chemical view of ministering to the nutrition of the nervous tissue, or not. An excellent and rather elegant tonic is a combination of ammon. carb. gr. iv + ferri ammon. citrat. gr. vij–x + tr. nucis vomic. ♏x–xv + tr. calumbæ ♏xx + aq. ℥i *ter die*.

No. 17.—Mrs. P., æt. 48, broad and fat, seen July 24th, 1862. Has always been a weakly-nerved person; has had ten children. For six or seven years has suffered with bleeding piles. Her first attack of head symptoms was in October, 1861, the second in April, 1862. She did not lose consciousness in either, but had pain at the top of head and backs of eyes. She recovered from the first attack in six weeks; from the second she still suffers. Complains of burning heat at top of head, at times has pain and great heat of head, the pain is increased by the recumbent position. Feels some numbness in both hands along the back of the fingers. Has double vision from paralysis of the right external rectus muscle. Head not tender. Pulse of good force. Does not feel weak. With strychnia and citrate of iron and quinine the external rectus regained its power, and I lost sight of her after October 23d till March 17th, 1863, when she returned to me feeling very weak, languid, and incapable of exertion. A week later the paralysis of the external rectus was complete. Much hemorrhage had been going on from the piles. She had great pain at the right posterior part of head, increased on lying down. The double vision caused her much annoyance from the objects passing her in the streets confusing her. Her piles were now got rid of by operation, but the hemorrhage from the bowel continued whenever she had a motion, and the state of the right eye was unchanged. Nothing could be detected in the rectum to account for the bleeding except a loose and baggy state of the mucous membrane. This was at last arrested by tannin taken internally, aided very materially by removal to the country, where her general health and strength much improved. By the middle of June she had regained a good deal of power over the external rectus. I urged a return to the country, but this was not carried out; however, the improvement continued, so that November 10th, when I last saw her, she had almost perfect power over the formerly paralyzed muscle. Some bleeding had recurred, but not to any great extent.

Remarks.—This case is an interesting example of a limited paresis of the nervous centres, involving the origin of one small nerve only. That the paralysis did not depend on organic disease must I think be admitted from the beneficial effect of strychnia, iron, and quinine on the first, and of country air on the second occasion. There can be little doubt that the long-continued hemorrhage was the cause of the general debility and local paresis, but it is remarkable that the latter existed before the former was felt to any notable extent. The pain in the head was probably neuralgic, yet it was aggravated on lying down. Enemata of krameria infusion, lead and opium pills, and sulphur internally failed to arrest the bleeding after the piles had been removed. The case is instructive in various respects, as showing (1) the connection between debility and paresis; (2) the necessity for close inquiry into the possible causes of paresis; (3) the superiority in some instances of a pure air to tonic medicines; (4) the dependence of hemorrhage in some cases on atony of vessels.

CHAPTER VIII.

SPINAL PARESIS.

THE nature of this state in general, and its efficient causes have been sufficiently described in the previous chapter; it only remains to illustrate its phenomena when it affects a different locality. This I shall endeavour to do by the relation of some cases, which appear to me of considerable interest.

No. 18.—C. M., æt. 39, butler, ad. Aug. 17th, having been ill five weeks. He states that his illness came on gradually, apparently from excess in drinking, not in venery. He is paralyzed to a considerable extent in both hands, so that he cannot dress himself, nor pick up anything. His feet are also weak and flap down in walking. There is a great if not complete loss of sensibility in the paralyzed limbs. The paralysis is getting worse. He feels very weak all over. Head hottish, but there is not much pain in it; he has never lost consciousness. Tongue coated at back. Bowels costive. Pulse large, soft. Urine of sp. gr. 1014, of good full colour, not albuminous. Blisters to the neck have been of no service. He was treated with quinine gr. v *ter die*, till Sept. 3d, subsequently with ferri et quin citr. gr. x + tr. nucis vom. ♏x *ter die*. He improved gradually and was nearly quite recovered by December 20th. I have seen him lately, and find he has had no return of the paralysis during the six years and a half that have elapsed since he was under my care In some cases it appears as if alcoholic stimuli taken in excess acted on the spinal centres much in the same way as they do on the cerebral, impairing and depressing their functional power. Last year I attended a female, who had been extremely addicted to brandy-drinking for years; as far as I heard her history she had never had delirium tremens, but she lost both motor and sensory power to a great extent in both upper and lower limbs for some months before her death. In her it is possible that the alcohol had caused sclerosis of the cord, as no remedies were of any avail.

No 19 —N. D., æt. 20, m., ad. September 10th, 1858. Ill one month with inflamed sore-throat, which has got well; but since then he has begun to lose the use of his limbs, the legs being the weakest. He can now stand, but not walk; the legs are very numb and cold, but he is conscious when they are touched. He has no pain at all, nor tenderness of the spine. Sphincters act. Intellect clear. No reflex actions are excited on tickling the feet. Pupils large and almost motionless. Skin cool. P. natural. T. white. No cough. Heart-sounds natural. Residence damp. Never had syphilis. As I could find no clear indication of organic disease of the nervous centres, I prescribed strychniæ gr. $\frac{1}{10}$, quin. disulph. gr. ij, acid. s. dil. ♏viij, aq. ℥i *ter die*, with ordinary diet and porter. 14th. Feels much better, has more use of his hands and legs and can walk a little. 17th·

Worse last two days. Has now sore-throat and much diarrhœa, with copious perspirations, and loss of appetite. "Has no use of the hands or legs again." P. c. mist. et tr. opii ♏viij ad. ℥i. 18th. T. very coated, yellowish. P. 120 full and weak. Some diarrhœa continues. Nausea and headache. Skin hot and moist. Cannot raise or turn himself in bed. P. c. mist. *quater die.* Vini rubri ℥vi *in die.* 20th. Bad cough. P. 96, full, occasionally intermittent. B. quiet. Adde quinæ gr. ij. sing. dosis mist. 21st. No sleep from cough, sputa watery and of a rusty colour. 22d. Feels much better, appetite improving. B. quiet. T. cleaner. No use of limbs. 25th. Galvanism was applied yesterday with great benefit; he is able to move his hands and arms much better. Appetite very good. Sleeps well. October 4th. The legs are now much more weak and numb than the thighs. A much stronger current required to excite the leg muscles than those of the thigh; the calf muscles are greatly wasted. The feet used to be very cold and numb, but are not now. The hands feel weak and are rather numb, he has "pins and needles" sensation in them at times. Strychniæ gr. $\frac{1}{16}$, tr. ferri muriat. ♏xv, acid. hydrochl. ♏ij, aq. ℥i *ter die.* 8th. Can now walk and feed himself; he cannot bear so strong a current as before. The same treatment was continued till the end of November, when he was discharged with only a slight degree of weakness remaining in the legs, which was referred to the knees. It seemed that the extensor muscles of the thighs had not regained their full power; he was able however to walk very well, and his arms had become quite strong. The dose of strychnia was gradually increased to gr. $\frac{1}{4}$ *ter die.*

A curious circumstance observed by himself was that his feet swelled during the night, so that he could not get his boots on in the morning, but after walking about the ward a little the swelling subsided. His urine was free from albumen and was otherwise healthy, except that at one time during the catarrhal affection it deposited much uric acid. I cannot but regard this as a very proving case. A man is admitted with incomplete paralysis consecutive (as he reports) to catarrh, after improvement has commenced he relapses, and becomes considerably more paralytic than at first, while simultaneously he is affected with asthenic bronchial and gastro-intestinal catarrh. Under a persistent tonic treatment he makes a good recovery. It seems impossible not to recognize in such a case as this the operation of a depressing miasm (influenza), acting with unusual potency on the whole nervous system. There is no indication of the paralysis being other than primary and direct, or that it is in any way attributable to remote irritation. The phenomena of vaso-motor paralysis were well marked in the skin and the mucous membranes, and the nocturnal swelling of the feet was owing, I believe, to the same condition. Is it conceivable that the vessels of the nervous centres were in a state of spasm, and that the paralysis depended on anæmia? What would have been the result of treating this case in the same way as the one recorded by Ollivier, *v.* p. 78?

No. 20.—A. W., female, æt. 9, has had paraplegia last three months, it increased rapidly after it commenced, and in fourteen days was as bad as

it is now. She cannot stand or walk, but can move her legs as she sits. There is no loss of sensation in the lower limbs, they have wasted considerably. The muscles of the lower limbs are very insensitive to the interrupted current, more particularly the extensors. The spine is much curved, convex backwards and to the right side. When the legs first became weak she had more constant pain in back, but it did not seem to be increased by friction. Beginning from the two lower dorsal vertebræ there is tenderness on pressing the spinous processes all the way down to the sacrum. No sign of any tumour in front of abdomen or thighs, no trace of any abscess. At times she has constrictive sensations in the abdomen. The legs have been painful and aching lately, they start sometimes. Urine pale, aqueous, sp. gr. 1016, not albuminous, often thick and offensive, is passed in small quantities and with discomfort. It deposits phosphatic crystals, consisting of aciculæ united in stellar groups. B. very costive, only opened by enemata, motions very dark and hard, when the b. act has much pain in lower abdomen and all over her. After a dose of aperient medicine the legs have often appeared weaker. Appetite always poor, capricious, aversion for meat. Had constant nausea when her legs began to fail, but this is less now, is most felt in mornings. The last six weeks has complained of constant pain in the forehead, and all over the head. Sleeps badly. ℞. Strychn. gr. $\frac{1}{30}$, ferri et quin. citr. gr. v, aq. ℥ss *ter die.* ℞. Ol. morrh. ℥i *ter die.* The limbs to be faradized daily. This was continued for a month, to October 30th, without any advantage, indeed she was reported altogether worse. The circulation was very feeble, the legs hypersensitive. ℞. Liq. cinch. flav. ♏40, pot. iod. gr. xxxv, ammon. carb. gr. xxv, tr. bellad. ♏80, aq. ℥vi. M. ℥ss *ter die.* Vini aloes ℥ss p. r. n. Empls. bellad. 3 × 6, spinæ dolenti. November 24th. The belladonna disordered her vision, and did no good, the plaster was worn for a time, but caused discomfort and was left off. The other remedies have been continued, the dose of bark and ammonia being increased, and infus. chirett. substituted for the water. The aloetic wine moved the bowels well for a time, but even ℥i doses fail now; it produced no depression like all other purgatives. The faradization has been continued, and the muscles of the leg as well as of the thigh are much more lively, acting briskly to the current. She cannot stand, but wriggles herself about pretty actively on her knees. The back appears much straighter than it used to be, she can at any rate sit quite upright without showing any deformity. There is still local tenderness in the lumbar spines as tested by pressure, or applying a hot sponge. She has also pain in the front of abdomen, on both sides, and all about it, but does not make her wince under steady pressure. Feels still very cold. She is much more active mentally, amuses herself one way or the other all day long. Pt. To have warm wine at night, and rum and milk in the morning. December 8th. Better, can walk from chair to chair leaning on her hands. Very pale. Is so pleased to be able to get about that there is risk of her over-exerting herself. 23d. After a relapse for a few days lately of debility and languor she has again improved so much that she now walks alone quite well, goes all round the room, and even up stairs, though she halts on the right leg. She says she has nothing like so much pain in the back as she used, she bears pressure on the spine much better. Appetite very poor still. Taking tr. cinch. flavæ ℥i *ter die,* and strychniæ gr. $\frac{1}{30}$ *bis die,* with rennet wine at meals. B. are comfortably moved by syrup. rhamni cathart., one day they acted of themselves, which they have not done for months. January 6th. Can now walk about very

well, but is soon tired. The mornings are her worst time, always complains then of being tired and languid. Sleeps and eats better. B. open without medicine. Feb. 13th. Has not made any distinct progress since, a fortnight ago had a relapse, which took her off her legs, and was attended with pain in her back and side, and sleeplessness. Has palpitations sometimes severe. P. good. Urine very thick and offensive last week, clear and natural now. Is extremely nervous and sensitive at night, has great difficulty in getting to sleep, is alarmed and trembles at every sound. Has had cold dashing every morning. B. in good order. F. + Q., citr. ℥. tr. nuc. vom. *ter die.* P. o. oleo. To be much in the open air in a vehicle. March 12th. Has not been much out; one day after being in the open air about twenty minutes she became almost insensible and could hardly speak. Is now better again, and pretty active on her legs in the house. The strychnia and bark have been resumed. ℞. Steel wine ℥i *ter die.* 17th. Has been moved to the country, has a better appetite last two days than she has had for a year, and sleeps beautifully. Walked yesterday three-quarters of an hour without fatigue. April 15th. Is looking much better and is in all respects much improved. Still she has not the free action of her legs that she ought to have, if she trips in walking she feels it in her back. September 1st. Has been again in the country for two or three months, latterly at Margate. She runs about for hours without being fatigued, and is altogether a different being to what she was. Still a little over-fatigue, especially in the *sun*, has a great effect upon her.

This case contrasts in several points with the preceding, although I believe the pathological condition was almost identical. The cause in the first case was a miasm acting upon an average system. In the second there was none to be traced, except it be admitted that some might have been generated from some broken-up clayey ground near the house where building was in progress. Solitary vice was of course suspected, but I believe there was no ground for the suspicion. The "grundleiden" seems to have been a most feeble state of the nervous centres especially of the cord, which was constantly lapsing into exhaustion, and which required persevering tonic treatment not only by drugs, but by pure air, and all that could recruit the feeble power. The excessive hyperæsthesia was both a product of the debility, and reacted on it and increased it, *v.* p. 44. In the first case there was little difficulty in forming at once the diagnosis of functional paralysis; in the second I felt considerable doubt for a long time. The chief circumstance that weighed with me in regarding the disorder as functional was the presence of such marked signs of general debility and hyperæsthesia. Had these been absent, I should have been much inclined to set down the case as one of organic disease. The local tenderness of the spine, the constrictive sensations, the phosphatic urine, and the paralysis were formidable symptoms, and might well have proceeded from chronic inflammation of the cord with softening. The insusceptibility of the muscles to the interrupted current was rather a favourable circumstance than otherwise; had the reverse been the case, it would have made the existence of actual central change much more probable. The progress of the

case was by no means plain sailing, the tendency to relapse from imperceptible causes was very marked, and nothing but steady perseverance carried us through. In all such cases it is wise to follow Dr. De Ricci's example,[1] and refuse to undertake the responsibility unless the friends consent to give one fair play.

It appears to me a very important question in regard to such states as the above, whether what was originally functional may not by long continuance pass into actual organic disease. Obviously it must be almost impossible to ascertain this certainly; analogies might be adduced both for and against its occurrence. I think the conversion of the one state into the other by no means impossible, and I feel assured that no time should ever be lost in adopting effectual treatment for the restoration of functional power. The experience of physicians in cases of what is termed infantile paralysis is strongly to the same effect; my own observation quite confirms the truth of Dr. West's remark as to the importance of early treatment. Though it is very possible that paralytic affections occurring in children, and much resembling one another, may originate in different pathological conditions, as Dr. Heine has lately asserted, yet I think the absence of signs of inflammation of the cord or brain, or their membranes, the existence of more or less debility and disorder of health, the non-progressive character of the disease, and especially the "juvantia," will not leave us long in doubt whether we have to deal with a paresis or any organic affection.

No. 21.—J. G., æt. 8 years, male, admitted Feb. 23d, having been ill three weeks. He has lost the use of his limbs, can move his feet, but not stand, or walk. The power of the arms is somewhat impaired also. Appetite bad. The palsy came on in the night; the child was quite well on going to bed; in the morning his mother found his legs quite palsied, the arms to a less extent, and the face drawn to one side; this last symptom lasted only a few hours. Steel wine was given for fourteen days without benefit, and afterwards ferri et quin. cit. + tr. nuc. vom. Turpentine liniment was applied to the back and legs. April 4th. He is able to stand and walk round a table, holding by it. The improvement was soon after interrupted by his having got some wrong medicine, and then by an attack of dysenteric diarrhœa, so that on April 22d, when the tonic was resumed, he had lost the power of standing. After this, however, he went on steadily to recovery, and in the beginning of July he had gone to school. The disorder in this case at first was somewhat extensive, involving not only the nerves of the upper extremities, but one of the facial. It soon however subsided in the higher parts of the spinal centre, and confined itself to the lower. Under tonic treatment it disappeared, after a temporary interruption by some debilitating circumstances. Clearly this is not the history of any organic disease. The tendency of the kind of paralysis we are considering to supervene during the night is quite a feature that belongs to the family of neuroses, *v.* p. 44.

No. 22.—L. S., æt. 23 years, f., ad. February 11th. Ill three months. Has lost the power of walking all that time, cannot now even stand alone;

[1] Dublin Med. J., Aug. 1862.

but can move her legs, which are not wasted nor cold. The paresis came on suddenly one day, she never had a fit. No pain in spine, nor distortion. No injury to the back at any time. Sphincters act. Has nearly all her teeth. Looks healthy. Some vaginal discharge. Strychnia was given till March 3d, the dose being raised from gr. $\frac{1}{30}$ to gr. $\frac{1}{20}$ *bis die*, and ol. morrh. 3i *ter die* given also. In a fortnight she was able to toddle round a chair holding by it, in another week she could just walk alone. Citrate of iron and quinine was then substituted for the strychnia gr. iv *ter die*, and in fourteen days she could walk across the room and pick up anything from the floor, though her gait was very straddling.

No. 23.—E. C., æt. 2, m., ad. Feb. 4th. Ill four months, became gradually worse; has lost the power of walking; bends forwards in sitting, cannot hold himself up. His legs tremble so that he cannot stand well. Arms all right. Has pain at lower abdomen, bowels loose, motions offensive, is thirsty, appetite bad, has lost flesh. Sleeps well. Has all his teeth but the last molars. Head distorted since birth, right forehead bulging, left eyelid droops. Never had fits. He was ordered ferri et quin. citrat. gr iij *ter die*, a grain of Gray and of Dover's powder *o. n.* for three nights, and subsequently a little tr. opii was added to the mixture. Ol. morrh was given besides. March 21st. The report is that he is getting on nicely, is a great deal better, runs about. April 4th. Improvement continues.

No. 24.—W. W., æt. 2¼, m., ad. Feb. 8th. Ill 1¼ year, unable to move the right arm and leg properly all that time, no material wasting of arm, halts in walking on the right leg; can walk a little, but often falls. Health now good. Had a fit for 2½ hours when 1¼ year old, when he was cutting two molars, and has had the paralysis ever since. His health was affected, at the same time he was languid and weakly. He was ordered cod oil and iodide of iron, which he continued till March 14th, when citrate of iron and quinine was given in place of the iodide. On 24th the report is that he is doing nicely, gets quite strong on his legs, can use his hand.

REMARKS.—In these four cases the palsy came on without apparent cause in three, in the last it succeeded to a fit. In all I think it may be fairly argued that no material damage had occurred in the centres. That the palsy was not of reflex origin I think certain, both from the absence of any cause of irritation as well as from the "juvantia." Had the vessels of the centres been in a state of anæmiating spasm, as Brown-Séquard assumes, would not the starved tissue have certainly degenerated and gone into white softening in cases of such long standing as Nos. 22, 23, 24?

When one limb only is affected it may not be always easy to form an opinion whether the disorder is seated in the cord, or in the nerves of the part, especially if one or two nerves only are involved. In proportion to the extent of the paralysis is the probability that the disease is central.

The following case affords an instance of some uncertainty in the diagnosis of the exact seat of morbid action:—

No. 25.—M., æt. 56, m., seen April 2, 1861, having been ill fourteen days since exposure to cold. He had a catarrhal affection when the paralysis came on. He suffers with wearying, aching, dragging pain about

the right shoulder, with loss of power in its abductor muscles. The arm hangs closely by the side of the body, and cannot be raised or abducted except by a jerk of the body. The deltoid and trapezius and other muscles about the shoulder are not wasted, but are more excitable and sensitive to the interrupted current than those of the opposite side; a moderate current causes much pain in these parts, and well-marked contraction of the deltoid especially. Two years ago he had similar enfeeblement of the right shoulder, but not nearly to the same extent as at present; it lasted nine months. This morning he could not feed himself with a spoon, nor tie his cravat, nor put on his coat. His vision fails at times, and he has had other signs of disordered nerve-action, as tremblings, twitchings, &c. He is very weak and thin. Skin warm. P. good. Urine used to be very thick; last three weeks it has been clear and of good colour. ℞. Ammonio-citrate of iron, carbonate of ammonia, tinct. of nux vomica, and infusion of calumba thrice daily; the shoulder to be rubbed daily with compound camphor liniment, and to be faradized. April 8th. General state improved, that of shoulder not much. A spot about the size of a shilling near the acromion is extremely sensitive to the current. ℞. Strychniæ gr. $\frac{1}{16}$ + tr. cinchon. ʒi *ter die*. 17th. Is decidedly improved, can abduct the arm to some extent. May 13th. Is quite recovered, and has full use of the arm. At times he has felt sensations in his legs of weakness and semi-paralysis.

REMARKS.—Had there not been some indications of failing nerve-power in other parts besides that principally affected, as in the nerves of the eyes and lower limbs, I should have felt much uncertainty as to whether the circumflex nerve alone was affected in some part of its course, or whether the disorder was central. The latter opinion, I have no doubt, is correct.

The nature of paresis, cerebral or spinal, is, I think, somewhat elucidated by reflecting on the condition of a nerve, such as the median or ulnar when affected with severe neuralgia. The function of the nerve is temporarily abolished, the skin which it supplies is utterly anæsthetic, and the muscles palsied. Under the influence of quinine and perhaps galvanism the sensory and motor power is restored. It is certain that these remedies would not amend a state of neuritis; and I can see no other view to adopt than that, owing probably to some minute molecular derangement of their tissue depending on impaired nutrition, the nerve-fibres are no longer capable of conveying centrad and peripherad the impressions they normally transmit. There is no difficulty in considering that the white fibres of the brain and cord may fall into a like state as those of the nerves, in which case the result would be the same as in peripheral neuralgia. The cells of the gray matter may probably be affected in the same way as the tubules, whose axis cylinders are continuous with their interior. This I am inclined to think is especially the case when the paralysis appears to be the result of a morbid impression (as cold and wet) made on the sensory surface of the skin. The following is an instance of this kind.

No. 26.—J. G., æt. 45, ad. Feb. 11th, ill two days. Has usually good health, does not admit drinking habits, but there is some doubt about this.

Is much exposed to wet in following sportsmen. He got very wet before the present attack, which came on suddenly; he was unconscious at first for a few minutes. He is now very giddy, and so weak on his legs that he can barely stand alone, and was brought to the hospital in a cab. Head rather hot, not painful, aching pains in neck and shoulders. Right hand is closed, he cannot extend the fingers, it feels numb. T. clean. P. soft. No strength, no appetite, no sleep at night. Bark and ammonia with valerian were given, and after ten days, two grains of opium *o. n.* March 7th. Able to walk to hospital, right hand numb and crampy. 28th. Arm galvanized three times without benefit. April 4th. Quinine and iron ordered. 18th. He improves, but states that his arm has been better every other day for the last week. May 28th. He can now carry a large basin and jug filled with water. July 4th. Getting on well.

I have recorded another case (*v.* Brit. Med. J., April 16, 1859), in which symptoms of paralysis with impairment and disorder of sensation appeared in a young man the day after he had been standing a long time in wet grass. The paralysis without being complete was remarkably extensive and diffuse, affecting not only the arms and legs, but the masticatory and ocular muscles. Death occurred in about a week from asthenia. Nothing was found in the autopsy in the brain or cord that accounted for the phenomena, nor did microscopic examination discover any exudation cells, any granular coating of the minute vessels, or any indication of structural change. In cases of this kind it seems that the nerve-cells of the cord, as the first recipients of the morbid impressions, have their nutrition in some way disordered, in consequence of which their functional power fails. Graves, in his lecture on paraplegia, records cases where the disease was induced apparently by exposure to cold and wet, and in which it came on gradually, though with very varying rapidity in different instances; some being rendered almost completely paraplegic in a few weeks, others not for months or years. He finds stimulating liniments, and blisters applied to the parts of the affected limbs most copiously supplied with nerves, the most effectual means conjoined with the administration of strychnia and sulphur internally. He records one case in which a very careful autopsy discovered no diseased condition of any organ.

The conditions above noticed embrace the most frequently occurring forms of paralysis of the cord not dependent upon organic disease. Reflex paralysis appears to me to be a much rarer affection. I have not met myself with an instance of it. As there appears some tendency to use the term rather loosely, I will repeat that it seems to me properly to belong only to cases where the paralysis is evidently dependent on a persistent irritation, increasing when this is increased, and *vice versâ*. It is characteristic of *true* reflex paralysis that removal of the irritation proves curative, while all other means fail. It is certain that no true case of reflex paralysis would be benefited by strychnia, or galvanic excitation of the nerves or muscles of the affected part, nor by stimulating applications to the

cutaneous surface. These are appropriate to the paretic state, and form by their success a good test of its presence.

There is another group of instances, which are not very uncommon, but the pathology of which is very obscure, and which I allude to without by any means affirming that they truly belong to the class of paresis. The following is an example:—

No. 27.—E. S., female, æt. 7½, seen Aug. 2, 1861. A month ago became feverish; her head or rather her neck was stiff. She had been treated for rheumatic fever, but does not seem to have had inflamed joints; the urine has deposited a thick whity sediment. Her legs became weak at once; after two days she had quite lost the use of them; the left arm was affected similarly a little before the legs, and remains so. She was delirious at first and had pain at the top and back of the head, which has ceased. For fourteen days she could not sleep at night for restlessness, sleeps now. There is no loss of sensation in the legs, but rather pain, she cries out when her calves are touched. No tenderness in spine. The muscles of all the paralyzed parts are very insusceptible to the interrupted current. She is quite unable to stand. Functions in tolerable order. I prescribed strychniæ gr. $\frac{1}{16}$ + ferri et quin. citr. gr. vi, aq. ℥ss *ter die*; the dose of strychnia was afterwards increased to gr. $\frac{1}{30}$, and the limbs were occasionally faradized. Oct. 5th. Is decidedly improved, can stand. The right leg is far the worst, and its muscles are insensible to the current, but the skin is hyperæsthetic, more so than it used to be. The left arm remains very useless; she has no power or but little over the flexors. Some stiffness in the muscles of the jaws from the strychnia. March 28th, 1862. Is decidedly improved, moves about actively, but the left hand and arm are still deformed, the hand drawn back on the forearm; she can however hold things with it. Dec. 31st, 1862. Walks about well, has walked some miles in a day, but halts still on the right leg. The flexors of the left hand are deficient in power, though she can use the hand tolerably. No medicine taken the last year.

The first question here for consideration is whether the disease was essentially acute rheumatism, attacking the cord. I am quite aware that rheumatism may appear primarily in the heart, but I doubt whether it is ever confined to this or any other internal organ, without sooner or later manifesting articular symptoms. There must evidently have been some resemblance to acute rheumatism in the febrile attack to have induced the attending practitioner to make this diagnosis. It is not easy to regard the disease simply as myelitis. The delirium, the very early supervention of paralysis affecting the cord as high as the origin of the brachial nerves, the absence of spinal tenderness when I first saw her, and as far as appears from the commencement, the preservation of sensibility, and the "juventia" seem to me to afford evidence against viewing the disorder as myelitis or meningitis.

It is a highly important point to which Dr. Gull has drawn attention that lesions of the cord are occasionally attended with an affection, which in many respects is closely similar to acute rheumatism.

The explanation of this probably is that the vaso-motor nerves of the whole system are paralyzed, and that in consequence pyrexia is set up. Case 27 recorded by this physician[1] is of very high interest. The patient, a widow working hard at a mangle, had for two years, when exerting herself much, felt pain in the back between the shoulders, and a sense of constriction and coldness round the chest. Ten days before admission she was seized with pain in the left leg, and spasmodic contraction of the muscles, with increase of the pain and constriction of the chest. She could extend the leg, but not walk. The next day there was febrile heat and diarrhœa, the hands, knees, and ankles were swollen and painful. A slough formed on the sacrum. On admission the hands were swollen, stiff, and painful with some erythema. The legs were so far paralyzed that she could only move them very feebly and slowly; the muscles very wasted, but retained their electro-contractility. Sphincters weak. Sensation nearly normal, but at times both legs felt numb, and were drawn up involuntarily. Touching the feet gave rise to formication and to very lively excito-motor movements. Eight days after admission the hands were still swollen and erythematous, the face flushed. Pulse 100, full. Perspiration had an acid smell. Pupils large. Nights sleepless. Urine ammoniacal. Opii, gr. i *6tis horis.* Wine 6 oz. daily and a chop. Under this treatment with faradization of the limbs she completely recovered in about six months. This case seems to me to have been essentially one of paresis of the cord with implication of the vaso-motor fibrils. The history is wholly that of nervous exhaustion, the symptoms are not contradictory (no pain or tenderness on pressure of the spine), and the "juvantia" are entirely corroborative of this view. The state of the urine and the good effect of the opium afford some tolerable evidence that the disease was *au fond* different from acute rheumatism. The occurrence of a slough on the sacrum in the existing condition of the vascular system is pretty good evidence, that the local death was not dependent on arterial constriction and anæmia as Brown-Séquard supposes it to be. It is much more probable that the impairment of nervous influence left the integument so enfeebled in its vital qualities that it was unable to resist the injurious influence of pressure. On careful consideration it appears to me highly probable that the case I have above recorded was essentially similar to Dr. Gull's, the quasi-rheumatic disorder in each being produced in the same way. In my case however the cause of the affection was probably some obscure influenzal or malarious miasm acting on a weakly nervous system. The child resided in one of the outskirts of London, where house-building was in progress, a kind of locality which I have often observed to be favourable to the generation of such influences. The long persistence of the paralysis suggests its dependence on some organic

[1] "Guy's Hospital Reports," 1858, p. 127.

lesion, but this is opposed by the decidedly good effect of tonic treatment, though it was by no means effectually carried out.

Diphtherial paralysis is very evidently a paresis. From its proneness to extend so widely over the nervous system, affecting not only nerves of motion, but those of common and even special sensation, it seems most probably to be a central affection. This is also inferrible from its being generally, if not invariably, bilateral. It is stated by Dr. H. Greenhow that diphtheric paralysis at its outset is peripheral, extending gradually upwards from the tips of the fingers and toes towards the trunk. This certainly is the usual description of what is termed peripheral paralysis (as distinct from a central affection), but it is obvious that it by no means implies that the extremities of the nerves are first affected, and that the morbid action gradually advances centrad to the cord. It really means that one set of nerves is affected after another, leaving it entirely an open question whether the nerve-roots are the seat of the disorder or the distal extremities. It is clear that the same phenomena would ensue if we suppose the morbid action to be located in the cord and to proceed gradually upwards from below. The view of the paretic nature of diphtherial paralysis is strengthened by the occurrence of similar paralysis after typhus in which, as Leudet affirms,[1] there is an absence of any morbid change in the brain or spinal cord. As far as I can find it does not appear that any organic change has been discovered in the nervous centres in fatal cases of diphtheric paralysis. The only exception is a case recorded by Mr. Humphry,[2] who found in one case a small suppurated spot with softening of the adjacent brain substance in the superficial part of the left cerebral hemisphere. Hemiplegia of the right side had been present, but had gradually disappeared. The connection of this lesion with the paralysis seems open to some question. Perhaps the strongest argument in favour of the paretic nature of the paralysis in question is the good result of a highly tonic treatment, which we shall presently notice.

The interval which most observers have found to occur between the cessation of the primary disorder and the supervention of paralysis is an important point for observation, as remarked by Dr. Greenhow, since it tends to show that the nerve affection is not attributable either to albuminuria or to anæmia. It seems also as if it could hardly be the result of the original poison or influence, as no indications of it appear while the action of the latter is in its full intensity. In this respect it resembles the renal sequelæ of scarlatina, which sometimes ensue at a period when convalescence has decidedly commenced. As numerous cases of even severe diphtheria recover without any paralysis it follows either that some special modification of the original poison must be generated in the system; or, what is

[1] "Gaz. de Paris," 19, 1861. [2] "Brit. Med. J.," July 4, 1868.

more probable, that a certain peculiar state of the nerve-centres is requisite to allow them to be rendered paretic by the poison. This state may be gradually induced during the progress of the disease. The opinion expressed by Gull with regard to typhus fever,[1] that elimination of the poison from the system by no means coincides with convalescence, seems to be verified also in the case of diphtheric paralysis. The basis of this view is a due appreciation of the importance of the vital state of the solids with reference to their liability to be affected by poisons. It is by no means necessary that the presence of a poison in the blood should evoke phenomena of disease; the latter may not ensue or may cease because the tissues either are, or have become inapt to be affected. This is a most material point for the practitioner, who often has no power to prevent the entrance or the stay of a poison in the system, but who may do much to render the system tolerant of it. *V.* a paper on the theory of elimination in the treatment of disease, *Brit. Med. J.*, April 24th, May 1st, 1858.

The treatment of diphtheric paralysis is wholly that of a paretic affection, and may stand for that of spinal paresis. This at least expresses the general opinion of those who have had experience. Wade is the only writer who finds more advantage from pot. iodid., ferri iod., and hyd. bichlor., than from strychnia, quinine, and iron. These, and especially the first, are the remedies to which I should always have resort, together with ol. morrh., a pure air, and a generous diet. The dose of strychnia may possibly require to be increased in some cases rather largely. I should not abandon its use in any refractory case, where the diagnosis of paresis was certain, until I had carried it to the extent of producing slightly its physiological effects. Dr. Bardsley[2] gave it in some cases of paralysis to the enormous amount of a grain and a half daily. Sulphuret of potassium baths have proved useful in this kind of paralysis, as well as in various kindred affections. This affords an instructive example of the beneficial effects of suitable stimulation of the sensory nerves of the general cutaneous surface. Although the effect produced on any one part is small, yet the total impression conveyed to the nervous centres is considerable, and probably by its mildness and general diffusion acts with great advantage. Dr. Copland relates a case of general motor paralysis removed after other means had failed by frequent recourse to warm baths containing stimulant substances. In one case of paraplegia under my care lamp baths and the cold douche to the spine had been of benefit. These remedial actions are just the opposite to the morbific inhibitory, but in both the same principle is involved, viz., that of affecting nervous centres through afferent or excitor nerves; the result in the one case being to depress, in the other to arouse the functional energy. Everything depends on the *kind* of impression made, and on the vital state of

[1] "Med. T. and Gaz.," April 5, 1862. [2] Hospital Facts and Observations

the nervous centre. The virtues of pine-leaf mud baths, and those made with the contents of ruminants' stomachs, are to be accounted for in the same way. The following is a well-marked case of diphtheric paralysis.

No. 26.—H. W., m., æt. 11, ad. April 23d. Ill two months. Has had severe attack of diphtheria, followed by violent sickness, albuminuria, ascites, and lastly the symptoms of paralysis of the soft palate and extremities. Liquids are apt to return through his nose when he tries to swallow. His arms are very weak, but not quite paralyzed. The legs are very useless, he cannot stand, and has very little sensation in them. His vision is affected, he cannot see near things well. The paraplegia has come on the last three weeks. The sickness has subsided. Three children and the mother of the family were attacked and one died. Ordered strychniæ gr. $\frac{1}{30}$, ferri sulph. gr. ij, spt. æth. s. co. ♏x, aq. ℥ss *ter die*, et ol. morrh. ℥i *ter die*. Lin. terebinth. dorso. The dose of strychnia was gradually raised to gr. $\frac{1}{15}$, and he was almost quite well by the end of June.

CHAPTER IX.

CEREBRAL EXCITEMENT.

THIS state is of course the opposite to paresis. The functional energy of the various encephalic centres is aroused, and shows itself by corresponding phenomena. Perhaps the stimulating influence of good wine, not of course its intoxicating, affords as good an example as we can have. The face is somewhat flushed, and the brain we may believe is too, the eye is bright, the flow of ideas is rapid, the tongue eloquent, the temper cheerful, and the spirits elated. Of the same kind, though altogether unnatural and infallibly pernicious, are the stimulating effects of opium. Cocoa, except in large doses, produces less intoxication, and its use is not followed by depression. All physical agents are however surpassed by intense mental excitement. Not to mention acute mania, the maternal instinct does unquestionably develop an extraordinary amount of energy and endurance in the weaker sex, sometimes overpassing it may be affirmed anything shown by the stronger. A mother will watch by her child's sick bed for days and nights together, till one marvels how it is that nature does not sink under the effort. In a milder degree mental stimulus shows its energizing influence in enabling us to endure fatigue to a much greater extent than we could do without it. A sportsman will keep on foot for many hours in pursuit of game who would declare himself "dead beat" with half as long a constitutional. The following story is so beautiful that I cannot

forbear quoting it.[1] "After the crossing of the Green River the whole party went on foot, and the men were becoming weaker every day for want of food. The painter who had one foot badly frozen became at last through lameness constantly the last man on the trail, and once his energy almost deserted him. He was at the top of a mountain of snow with not a tree to be seen for many miles. Night was approaching, and in the direction taken by his comrades not a sign of life could be descried. He sank exhausted on the snow bank, and took out of his pocket for a farewell look the miniatures of his wife and children. *Power came to him out of their faces.* He thought how little his wife could afford to be a widow, or his children to be fatherless, beat down his despair and struggled forward. It was not till late at night that he arrived at the camp fire."

The effect of cerebral excitement varies extremely according to the previous condition of the organ. A strong well-balanced brain will bear a great deal of excitation without showing any irregular or violent reaction, or subsequent debility; while a weak and excitable one will be provoked by a less amount of stimulation to manifest phenomena of morbid activity, and will fall subsequently into great collapse. It is just in the difference of capacity for enduring the wear and tear of excitement that original endowment and training show the greatest influence. One man will sleep soundly and digest well under the same anxiety which renders another wakeful and dyspeptic. It is related that the Iron Duke, on the eve of an engagement, was aroused during the night from his sleep by a message that some important point was seriously menaced. Having reflected for a moment he pronounced it erroneous, and turned off to sleep again. He was right, but few men could have composed their brain to sleep after such an awaking, even though they were persuaded that the alarm was groundless. In these days of feeble and sensitive nervous systems it seems to me to be one of the most important parts of education to develop by physical and moral training a robust and non-excitable state of brain, so that the individual may be well able to confront the strain and struggle of actual life. It is in not affording this robust vigour but generating hyperæsthesia instead that tender nurture becomes often positive cruelty.

The *morbid* states characterized by cerebral excitement are chiefly those in which delirium is a conspicuous feature. Quiet muttering delirium tending towards coma may be left out of account. Active delirium, sthenic and asthenic, and the so called delirium tremens, are the states we propose to examine. Sthenic delirium is a common result of meningitis, and of ardent, and of other high fevers. The gray matter in such cases is usually found after death of a darker colour than normal, and sometimes especially in young persons is distinctly reddened. The white substance exhibits numerous bloody

[1] Household Words, March, 1857, p. 264.

puncta. There can be no doubt however that fierce delirium may occur when there is no remarkable vascular injection, at least when no traces of this are found after death. In fact in this as in a multitude of similar instances the excitation of the tissue is the primary change, and the vascular repletion is secondary and varying. If the normal tissue activity be great, though the gray matter will probably be dark, yet there will be no effusion of lymph, and no material capillary engorgement. If however the functional power of the tissue fails, and an inflammatory condition commences, we shall have considerable vascular repletion, and probably more or less exudation, which however may not extend beyond mere coating of the vessels with granular deposit. There is no inconsiderable analogy between a diarrhœal or a salivary flux, and active delirium. In both extensive tracts of cell-growth are stimulated to an excessive and rapid nutrition, which interferes with the due development of the individual particles. In the former instance the cells being disposed on a free surface are shed rapidly; in the latter we are unacquainted with the precise changes which the cells undergo. Assuming the correctness of the general opinion, that the axis cylinders of the nerve-fibres are continuous with the granular interior of the nerve-cells, it seems almost a necessary consequence that disordered and hurried nutrition of the latter would communicate itself to the axis cylinders, and so give rise to abnormal sensations, and disorderly motor impulses. The very varying amount of cerebral excitement in different instances of the same kind of fever must be admitted to depend in part on corresponding differences in the quality of the nervous power. The poisons are doubtless the same in all cases, but the condition of the recipients may vary greatly. Of course much will also depend on whether the poison be specially determined to the head or not.

It is not yet fully determined what changes occur in the urine in cases of sthenic delirium. In meningitis and acute mania it is probable that the phosphoric acid is much increased, but this is not yet fully established. It would be highly desirable if we had some trustworthy indication, from this or from any other source, to guide us as to the existence of really sthenic delirium in any given case, but we fear we have none such at present, and that we must rely in this as in many other instances on our discriminative tact. Of course if a patient has a flushed face, and hot head, a firm not very frequent pulse, a ferrety eye, a contracted pupil, and shows considerable muscular power and energetic action there is no room for doubt; but in such a case as that recorded by Graves (v. *Clin. Med.*, p. 175), where the patient, though violently delirious and unmanageable, "on the borders of frantic madness," had a pulse almost uncountable from quickness and exceedingly weak, with cold extremities, the most experienced would hesitate as to the proper means to be adopted. Graves says, a very few leeches would kill him, blisters would be too slow in their action, and might even aggravate the

disease, cold affusion seemed inadmissible. Yet this man took in less than forty-eight hours 12 grains of tartar emetic without any prostration being produced, while the cerebral excitement was calmed, sleep induced, and the pulse rendered slower, and much softer and fuller. A right discrimination in such emergencies as this is indeed a high attainment, the more so as the remedy is quite capable of being very pernicious as well as beneficial.

Active delirium in rheumatic fever is in the great majority of cases the result of an increased excitability of the nervous tissue, and is not dependent on inflammatory movement. In the cases referred to by Dr. Fuller where actual meningitis had occurred the delirium had been rather of a low kind. Dr. Copland distinguishes two sets of cases, one where delirium or mental disorder occurs in the course of acute rheumatism, without any abatement, or but little either of the fever, or of the local disease. In these cases, he says, the head affection is chiefly nervous, and contingent upon the febrile condition, in connection with depression of nervous or vital power. In the other, the head symptoms appear at an advanced stage of acute or sub-acute rheumatism, and are generally followed by the subsidence of the disease of the joint. The patients are exhausted or cachectic, and the head symptoms are more or less indicative of inflammatory irritation of the brain or its membranes. In my own experience the form of delirium I have mostly met with in rheumatic fever has been of the first kind, and has chiefly occurred in cachectic or feeble subjects. In one instance which I shall presently relate the head symptoms, which were of a highly sthenic character, coincided with cessation of the articular affection, which reappeared again to some extent as the former gave way. There seems much reason to think that the exciting cause of acute rheumatism, whether it be an imponderable influence, or a material virus, attaches itself especially to the nervous system, and works through it. If the nervous power is strong and steady, the inflammatory phenomena will proceed in an orderly manner to the termination of the disease. But if the reverse is the case, if the nerve power is weak originally, or gets exhausted by injudicious treatment, the irritability of the brain becomes greatly increased according to the general law (v. p. 44), and it is affected in a much more intense measure than it would have been in a stronger state. This is an instance we think where a judicious solidism is essential to true pathology, and to successful treatment. The exciting cause of rheumatic fever must be no doubt the same in all cases. Yet in the great majority the delicate structure of the brain is unaffected by the poison, or the morbid influence whatever it be. In a few however who have less resisting power the function of the nervous tissue is disordered. Clearly the principal object of treatment should be (in such cases) to strengthen and aid the weak organ to bear up against the perturbing agency. For this opium and stimulants are requisite. Though theory might incline us to try to quell the irritation by thorough alkalization of the

system so as to neutralize the presumed acid materies morbi, yet practically we find that this is insufficient, and that we must deal with this and with all the visceral complications of rheumatism as substantive disorders. The same indeed holds true of delirium in all cases; it must be treated according to its quality, without regard to its presumed cause. In such asthenic delirium as we have been considering the disorder of nutrition may be well compared to that existing in neuralgia, a non-inflammatory molecular derangement of the tissue. In sthenic delirium it approaches more to inflammatory action, and probably in extreme cases may pass into meningitis.

As regards the treatment of active delirium very much of course depends on the nature of the affection, and the presumed pathological state. If the disorder be of sthenic character, various depressant measures will be found essential. It is the fashion with some to depreciate Abercrombie, but there seems to be no question (unless we accuse him of deliberate falsehood) that he has left us most valuable records of the successful treatment of cerebral disease as it occurred in his day. I do not see if we accept his cases as truthful records that we can question the beneficial effect of general and local bleeding, and of hard purging. Abercrombie candidly states that the cases terminating favourably form but a small proportion to the whole of those he has met with, but this does not alter the fact that in certain cases this evacuant treatment was successful. I am not at all disposed to be a blind worshipper of authority; I desiderate carefully-recorded observations in proof of general views, but when I have these I shall not reject or ignore them because they do not accord with my own experience. Abercrombie's testimony is fully corroborated by that of other observers, and looking at the whole no doubt exists for a moment in my own mind as to the propriety of adopting the means he recommended when we have sthenic conditions of system to deal with. Dr. Marshall Hall places congestion of the brain at the head of the list of disorders which increase tolerance of bloodletting. It is scarcely necessary to say that if venesection be requisite it should be performed in such a manner as to make a speedy impression on the system, and induce semi-syncope. The importance of choosing the right time for venesection has often been pointed out. As a remedy it belongs to the initiatory period of inflammation, before exudation to any amount has taken place, while the heart's action is forcible, and the bloodvessels retain their tone. In tropical fevers it is of vital consequence to employ it seasonably. Ranald Martin writes, "What was a saving means at the commencement of the paroxysm is as surely destructive at the end of it." In minor degrees of sthenic delirium leeching the head may be sufficient; Graves and Corrigan speak very favourably of its effects. The application of cold to the head is also a means of prime importance. Southwood Smith adduces cases to show that where headache and delirium are present, and the lancet is inadmissible, placing the patient in a warm bath, and directing a forcible stream of very

cold water on his head, soon renders him more calm, relieves his headache, and for the time dissipates the cerebral symptoms. Graves adds his testimony that the effects of this remedy are extremely remarkable, and thinks that many of the cases in which he has employed tartar emetic with such signal advantage would derive equal benefit from this mode of treatment. Von der Decken and Brand[1] have lately found baths and cold affusions of eminent service in typhus, especially in tranquillising the brain and preventing delirium. Abercrombie prefers the cold stream to the application of pounded ice, but warns us that it is a remedy of such power that it requires to be used with discretion lest it produce excessive prostration. It is most probable that the *modus operandi* of the cold douche to the head consists in its exciting in the cutaneous nerves an impression which is propagated through the centre to the vaso-motor nerves of the cerebral arteries, and induces their contraction. On the same principle, viz., of inducing anæmia, a stream of water has long been used in some countries as a means of sending children to sleep.[2] Tartar emetic combined with opium has already been mentioned as a powerful remedy in violent cerebral excitement. Graves by no means proposed it as a specific to be given in all conditions; he does not advocate its use at the commencement of fever, when other antiphlogistic measures may be more advisable, but at a later period, when symptoms of general debility announcing the typhoid type begin to predominate; and when the condition of the patient approximates to that observed in certain varieties of delirium tremens. Graves lays down that the relative portions of tartar emetic and laudanum must be varied according to circumstances. "When congestion of the brain is known to exist or is feared, the tartar emetic must not fall short of 4 grains in the 8 ounces, while the laudanum should not exceed half a drachm; but when nervous symptoms predominate the laudanum may amount to ʒi, and the tartar emetic to gr. ij; no general rule, however, can be laid down, and the practitioner must in all cases watch the effect of this medicine from hour to hour, until he ascertains whether it agrees with the patient or not." It is clear from Graves's cases that he considers the existence of very marked debility no contra-indication to the treatment. He states that it has sometimes disappointed him, but makes no mention of any disastrous effects produced by it. We have heard from those who have employed this remedy that such are by no means impossible. It was not for mere nervous disorder that Graves used tartar emetic and opium, but for nervous disorder combined with cerebral congestion. Wine, musk, porter and opiates would control the nervous symptoms alone, but not when they were blended with the effects of cerebral hyperæmia. In some of the cases, but by no means in all, the pulse before the tartar emetic was given was

[1] Schmidt's "Jahrb.," vol. cxvii. p. 125.
[2] Graves's "Clin. Med.," p. 745.

small and wiry as well as frequent. The action of the medication was always to reduce the frequency of the pulse and render it fuller, and in some cases much softer. It is unfortunate that we have no information as to the quality of the first sound of the heart in the cases which Graves relates. One cannot but entertain much apprehension that tartar emetic would be a perilous drug to exhibit when the heart's tissue was seriously softened and enfeebled. Ackermann[1] always observed after injection of tartarized antimony a diminution of the force of the blood in the aorta, which took place whether the frequency of the pulse increased or diminished, but was greatest with a slow pulse. In dogs killed by tartar emetic the irritability of the heart examined immediately after death was remarkably diminished, and sometimes altogether extinguished. On the whole the safest conclusion that one can arrive at with regard to this medication seems to be that it is chiefly appropriate to conditions characterised by high nervous excitement associated with more or less active cerebral hyperæmia. One of the best criteria for judging of the degree of cerebral activity will be the capacity displayed for muscular exertion. If this be considerable, it is clear that a good deal of vis nervosa must still exist, and we may proceed more boldly. Some important general inferences may be drawn from the remarkable facts ascertained by Graves. (1) That in certain morbidly excited conditions of vital power depressing remedies are well borne and may be essential to preserve life. (2) That this morbid excitation may be confined to one organ, as the brain. (3) That tartar emetic operates as a tissue sedative, and when it acts most favourably confines its sedative action to the morbidly excited organ. The case first alluded to illustrates forcibly the two last propositions; the brain was violently excited but the heart was far from being so or any of the other organs;—the antimony produced no depressing effect but seemed to expend itself on the brain. This is what it has been found to do, when it has acted most beneficially in pneumonia, but this is just what it is often at the present day impossible to insure.

Colchicum is a remedy which has been found of admirable effect in calming high delirium of sthenic character associated with cerebral hyperæmia. Dr. Hamilton Roe gives gr. v of the powder every two or three hours until the face is blanched, and the morbid action quieted. In some visible inflammatory affections of the eye it acts similarly. It is a remedy of the same kind as tartar emetic, and to be used with the same precautions.

Hydrocyanic acid has lately been strongly recommended by Dr. M'Leod[2] as a powerful calmative in acute maniacal conditions where no grave structural change exists, and where the morbid action has not become as it were stereotyped by frequent recurrence. He con-

[1] Virchow's "Archiv"—"Brit. Med. J." Aug. 29, 1863.
[2] "Med. T. and Gaz.," March 14, 21, 1863.

siders that it checks the morbid activity of the brain, "the excessive and purposeless cerebral vigour." Sound sleep sometimes follows, but is by no means a necessary result of its beneficial action. The dose is ♏v every quarter of an hour till some manifest effect is produced. If there is any difficulty in administering it by the mouth, the method of subcutaneous injection may be employed. In the latter case the ♏v of acid are to be combined with ♏xxx of water. M'Leod has no doubt from his experience that it has the power of promptly staying cases running on to chronic insanity on the one hand, or exhaustion and death on the other. As its best ascertained therapeutic effects consist in removing various neuralgic affections, it is probable that it is more appropriate to states of the brain in which simple excitement of the tissue constitutes the disorder, than to those of which hyperæmia forms an essential element. It is a less depressing remedy than the two preceding, but an over-dose produces a stuporous condition and other phenomena resembling those attending an epilepsy.

The foregoing remarks relate to the treatment of sthenic delirium, but we have seen that acute or active delirium may be asthenic. It may be no easy matter to distinguish between cases requiring depressant measures, and those for which stimulating are essential. If we read Grave's remarks on the subject of giving wine and opium in fever we cannot but remark that he felt it not uncommonly to be a difficult question to decide when they were to be given, and when withheld. He states, "that we must rely in the more advanced stages of fever on the tact acquired by previous experience and reflection, and must often depend more upon a correct estimate of the general state of the patient than upon the appearance or absence of any particular symptom."[1] Sleeplessness with restlessness and irritability, the patient constantly endeavouring to leave his bed and having delusions—these symptoms may urgently demand wine and opium. Violent and continuous delirium forbids, in Graves's opinion, a stimulating treatment, but this does not hold if though there be a good deal of raving it is nocturnal. Stokes gives a case (p. 404)[2] where there was violent delirium throughout the night (two days later it is simply reported that there was such delirium without specifying that is was nocturnal), in which 16 ounces of wine daily with camphor, musk, and opium appeared to be highly beneficial. In one of Dr. Todd's cases of erysipelas[3] the patient had such violent delirium and created so much disturbance that he was obliged to be placed in a separate ward. With ℥ss of brandy every two hours and ♏xx of laudanum every four hours the delirium was unabated, but diminished considerably and soon ceased after the brandy had been given every hour, and the laudanum had been replaced by bark, chloric ether and ammonia. In another case, one of epileptic

[1] "Clinical Med.," p. 187. [2] "Dis. of the Heart and Aorta."
[3] "Clin. Lect. on Acute Diseases."

delirium, very violent and constant delirium subsided in about four days under ℥ss of brandy every hour, with carbonate of ammonia and laudanum every four hours. The pulse steadily declined in frequency during the administration of the stimuli. Todd speaks very confidently also of the efficacy of alcohol in preventing delirium in patients suffering under various acute diseases. He evidently holds that it is better to err on the side of giving too much than too little stimulus. The points to which we should have most regard in endeavouring to determine the quality of the delirium we have to deal with are: (1) The general condition and constitution of the patient; (2) The state of the urinary secretion; (3) The state of the pulse; (4) The quality of the first sound and impulse of the heart; (5) The state of the pupil; (6) The state of the skin; (7) That of the bowels. If the patient be enfeebled from any cause, and has not previous to his illness enjoyed vigorous health; if his urine is in good quantity, not highly acid, red, or of high spec. grav.; if the pulse is easily compressed; if the first sound of the heart and its impulse are weak; if the pupil is dilated; the skin not very hot and dry, and the bowels relaxed, we have good grounds for expecting that stimulants will be beneficial. In proportion as the above signs are less marked, the indications become less clear, and we must resort to what is often a wise proceeding, viz., testing the condition of the system with some remedies, the result of which may lead us to take the right course. The more we can perceive the signs of excitement without power in the cerebral disturbance, the more bold we may be in our administration of stimulants and support. In cases of this kind opium is often necessary, and its dose must depend on the degree of excitement, and on various other circumstances. Too small doses may only aggravate the excitement, and too large may bring on dangerous or fatal stupor. The determination of this point is one of the most delicate in therapeutics, and cannot be solved, at least in all instances, by administering small tentative doses in succession. I am much inclined myself to give large doses of hyoscyamus, as ℈j of the extract, in cases where it might not be safe to give a full dose of opium. If we prefer the latter the amount of cerebral excitement is the chief measure we have of the quantity of the drug which will be requisite to calm it. If the pupil be contracted, belladonna may be given as an hypnotic with advantage as Dr. Murchison tells us. Hyoscyamus would probably be suitable in the same state. In cases of the kind we are now considering brandy mixed with milk will be found one of the best forms for administering stimulus and food. It should be given of course at very short intervals, say ℥ij of brandy + ℥ss or ℥vj of milk every hour or half-hour.

No. 27.—W. L., æt. 25, of spare frame, delicate constitution, carpenter, seen March 28th. Ill with acute rheumatism about ten or twelve days, his head began to be affected two days ago. Five years ago he was under Mr. Culpepper's care for a very severe attack of acute rheumatism, attended

with endocarditis and pericarditis. Five years before that he was under my care with similar disease. On March 21st he had ten leeches to the precordia for threatening cardiac inflammation, poultices were subsequently applied, and calomel and Dover's powder given every three hours with a draught of pot. nitras, potas. bicarb. and sod. phosp. 25th. Is nearly free from the pains and swelling of the limbs except in the extensors of both feet; skin still exudes an offensive copious perspiration. 26th. Gums affected. Rheumatism has quite disappeared, just as it did five years ago suddenly while the pericardium became inflamed. Calomel omitted, Dover's powders and salines continued. 27th. In the course of the night he became quite delirious and incoherent, uttering alarming shrieks so as to disturb the neighbours, with fits of fearfulness and apprehension that the ceiling was about to fall, &c. Eyes wild and restless, can scarcely be made to comprehend any question. Head hot and skin generally. Tongue dry and covered with yellow crust. No urine passed since last evening. Hands are tremulous as in delirium tremens. Hair cut short and cold applied to head, hot mustard fomentations to the feet. Opii gr. i 3tiis horis with effervescing draughts. Furious delirium continued all the day; four persons were required to keep him in bed, he would not take the pills or mixture. At 5 P. M. Mr. Culpepper gave him gr. j of opium, and at 9 P. M. gr. ij, matters were then greatly worse. At 11 P. M. Mr. C. was sent for, the patient was said to be in a strong fit of convulsions. When he saw him, he was in a terribly excited state, eyes staring, jaws clenched, heart beating violently. Pulse 130. Great heat of surface. Tr. digitalis ℥ij + tr. opii ℥j was directed to be given in two doses, at 12 and 3 A. M. At 6 A. M. he had liq. opii sed. ℥j in two doses. I saw him with Mr. Culpepper at 9.30 A. M., and learned the above history and that he had had no sleep for two nights. Pulse 117, of good force. Tongue denuded, cracked, red, covered with sordes. Is partially conscious, does what he is told, says he has no pain anywhere, is constantly talking deliriously. Rheumatism has quite disappeared in spite of counter-irritation to the limbs. Urine passed in bed. Head rather hot. Heart's sounds fairly clear, no pericardial effusion, slight questionable exocardial bruit. Right pupil dilated until lately, is now of medium size and fixed. Left eye lost. No pneumonia or bronchitis. We agreed that he should have six leeches to the temples, cold to his head, and gr. ½ of tartar emetic every half hour.

31st. He began the treatment at 11 A. M. of 28th, and took gr. ½ every half-hour till 11 P. M., when the pulse was 95, the skin was cool, and the delirium nearly abated, in short everything going on well, which induced Mr. C. to give the mixture less frequently, every one or two hours. At 5 A. M. of 29th he was not so well, so the mixture was given as before with liq. opii sed. ♏iv in each dose, and from that time to 10 P. M. of 30th he has made rapid and permanent improvement, and is now quite himself again in every respect, asking for and taking food, and knowing every body about him; delirium quite ceased. In fact but for the return of the pain and swelling of the right hand one could not say what had been the matter. The left shoulder is also painful. Complexion clear, countenance calm, pulse 86, and respiration tranquil.

April 1st. Sleeps and eats well; omit the antimony and opium. 2d. A light tonic with sodæ phosph. was given, as the urine still deposited lithates. Joints free from rheumatism. 6th. Is up and dressed and considers himself quite well. Mr. Culpepper, to whose kindness I am indebted for the report of the case, adds that during the four days he took over 30 grains of

tartar emetic and ℥ij of liq. opii sedat. Rheumatic pains reappeared on night of 29th and continued till April 3d; all other symptoms gradually but most distinctly abated, and not the slightest bad effect was produced by the antimony, no approach even to nausea or sickness, or purging, or depression of the heart's action. After the 30th the medicine was given less frequently.

REMARKS.—There can be no question that the tartar emetic was really the efficient means of this patient's recovery. Opium had been taken previously without benefit, and was not given the first day, when nevertheless a considerable sedative effect was produced. The relapse which ensued when the antimonial was given less frequently, and the steady improvement after it was resumed at the former rate, prove that it was the chief remedial agent. Its action seems to have been remarkably limited to the brain calming the excitement of its tissue without producing any other notable effect. The case was evidently not one of ordinary rheumatic fever delirium; there seems to have been actual metastasis of the morbid action from the joints to the brain, with subsequent recurrence of it in its usual site. Considering that the heart had been severely attacked before I think it is very doubtful whether there was any actual affection of it on this occasion. If there was it was slight, and had I believe no connection whatever with the cerebral symptoms. Altogether the case may stand for a Παραδειγμα of sthenic delirium.

The following case related by Dr. Posner[1] is worth comparing with the foregoing:—

No. 28.—A man, æt. 37, fell ill of acute rheumatism. Both hands were affected, the pulse was 100, and the other symptoms were as usual except that he was remarkably restless. The inflamed parts were much relieved by leeching, but the elbow-joints became engaged, and the upper arm and neck muscles were painful. On the next day after considerable delirium the joints became quite painless, the pulse was 65, the patient only complained of occipital pain. There was no indication of intercurrent delirium tremens, the cerebral disorder was viewed as a rheumatic meningitis, and treated by local detraction of blood, and ice applications, with tartar emetic opium internally, and mustard poultices to the joints which had been inflamed. The delirium continued two days and nights in spite of repeated bloodletting, the pulse fell more and more, and the joints remained painless until large doses of opium were administered, which produced on the third night sleep for seventeen hours, out of which the patient awoke rational but with severe pains in the neck and stiffness of the elbow-joints. The pulse had risen moderately and the general condition was better. After a second tranquil night the pain returned in the joints which had become affected with all its former severity, and this condition lasted some days, when it suddenly ceased, and in its place the old cerebral symptoms returned. These yielded again to the opiate treatment, and the joints became affected for the third time, and remained so until the disorder disappeared entirely in about fourteen days. The heart was never attacked.

No. 29.—Mr. L., æt. 25, a delicate man, seen in consultation with Mr. G. Brown, Dec. 13th. He had been ill about ten days suffering with

[1] "Med. Centr. Ztg.," xxviii., 27; 1859.

rheumatic pain and latterly with some pleuro-pneumonia of both lungs at the posterior bases, most marked and extensive on the right. Respiration very quick and shallow, 60 in the minute. Pulse 108, weak. Skin cool. No cough, or expectoration. Extreme thirst. Tongue thickly coated. Heart's sounds normal. Ordered mist. pot. citrat. efferv. ℥j, tr. opii ♏vj, pot. iod. gr. jss, spt. æth. chlor. ♏xij, *4tis horis*. Opii gr. j *statim*. Dec. 14th. Slept well, respiration 30; feels better. In the course of the following night Mr. G. B. was sent for, as the patient had become "raving mad." He gave him gr. j of acet. morph. + gr. v of calomel, and repeated the same in two hours. This speedily quieted him, so that the following day he was quite rational. He was now well supported with a very generous diet, and made a good recovery.

No. 30.—W., f., æt. 30 (about), seen Sept. 10th. Has had swelling and purpuric eruption on right leg last four days, and the last two on right elbow. Leg much swelled and very tender. Is markedly weak, has not been without vegetables. In two days with iron and quinine and citric acid the purpura had disappeared, and two days later rheumatism commenced. Nitre and citrate of potash saline. 18th. Was delirious all last night, is rational this morning, but intellect not quite clear. Heart's sounds normal; ordered mist. ammon. acet. ℥j + ammon. carb. gr. iij, *4tis horis*. Brandy ℥ss *2dis horis*. Broth diet. Beef-tea. After this there was no more delirium, but the rheumatism though never more than subacute lingered about her for a long time. She did not leave the hospital till the end of October.

No. 31.—Mrs. B., a young-looking primipara, confined six days ago, seen Jan. 27th with Mr. Ferguson. She had a quick and on the whole favourable labour: the pains being sharp and strong. The milk and lochia have continued: she has had no unfavourable uterine or other symptoms, no indication of fever. She has been quite sleepless and maniacal, raving and talking continually ever since her confinement in spite of large doses of opium, as much as ℥ss of liq. opii sed. in one day, and some large doses of henbane. They have quieted her a little, but not much. She answers quite rationally when spoken to by me, but as soon as she is left talks deliriously. Urine normal. Bowels have been confined, are open now, and she has been better since. Pulse of tolerable strength, 88. Circulation active in forehead, the skin reddish and is scarcely pale for a moment after the pressure is removed. We agreed to give ant. pot. tart. gr. ¼ + liq. opii sedat. ♏x *2dis horis*. This medication made her much more delirious; it was difficult to keep her in bed. Mr. F. then administered tr. hyoscy. ℥ij, *3tiis horis*, with which she became quieter; had a good night Feb. 2d, and improved materially. The antimony caused vomiting after four doses and flushing of the face. She went on taking tr. hyoscy. About ℥x daily for some days and quite recovered.

Remarks.—In this last case the treatment which succeeded so well in the first was evidently inappropriate. Yet from the appearance and condition of the patient I had great hopes that it would prove successful. Perhaps it may not have been altogether useless, by rendering the brain more amenable to the influence of the henbane than it had been previously. In this respect the utility of what are called lowering remedies is I think sometimes overlooked. They may not apparently effect much themselves, but they prepare the way for others. The conclusions to be drawn from the above cases seem to be these. (1) That the quality of the *vis nervosa* in delirious disorder varies greatly. (2) That it may be very difficult to ap-

preciate or gauge this quality correctly. (3) That nevertheless it is most important to do so, as the treatment depends upon it. (4) That any exclusive mode of treatment by stimulation, or the reverse, or by sedatives is out of the question.

CHAPTER X.

DELIRIUM TREMENS.

We next come to the state known as delirium tremens. This is for the most part considered to be invariably the result of alcoholic excess, but I think there can be little doubt that a state closely resembling it, if not identical, may be generated by other causes. Watson states that this may happen from prolonged anxiety, J. Johnson from over-study. In continued fever a state closely resembling delirium tremens is not unfrequent. The case is narrated[1] of a stoker of good character serving on board H. M. S. Reynard, who fell apparently in consequence of excitement at the murder of two of his shipmates by the Japanese into a state of perfect delirium tremens, not one symptom being absent. It was proved that he had not been indulging in alcoholic excess. He was put to sleep with tr. opii ♏ 40 + chlorof. ♏ xv. Fox records[2] a case to the same effect, the disorder supervening on exposure to cold and wet. He is positive that no indulgence in intoxicating liquors had anything to do with its production. Dr. Monckton[3] relates the case of a female, æt. 28, who rather more than three months after her confinement presented an almost typical state of traumatic delirium tremens; "the breast abscess consummating the overthrow of brain equilibrium," for which previous and successive mental shocks had prepared the way. This testimony as to the production of delirium tremens by other causes than alcoholic seems to me very important, as proving that the peculiar morbid state is not necessarily one of poisoning at all. It may be a sequela, or result of poisoning matter, which has passed away from the system, or may be solely a diathesis. The discussion which has lately arisen respecting the proper treatment of delirium tremens makes a careful reconsideration of its pathology necessary. Those who contend that the disease is specific and dependent upon alcoholic poisoning deny that it ever originates from deprivation of the customary stimulus, and assert that in all instances where this is apparently the case the paroxysm has only been accelerated in its arrival by the accident or disorder, which has interfered with the usual indulgence. Dr. Marston however

[1] "Lancet," Oct. 11th, 1862.
[2] "Lancet," May 7th, 1859.
[3] "Edin. Med. J.," Oct. 1860.